DECEMBER 1940

FOOD INDUSTRIES

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OMES OF FAMOUS FOODS . . . QUAKER OATS CO., CEDAR RAPIDS, IOWA

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Britain Puts Vitamin B_1 in Bread

Mass Production Methods Put To Work

Better Dust Control Needed

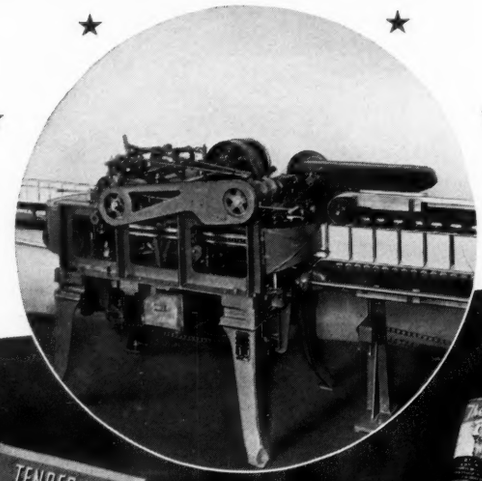
What To Know About Filters

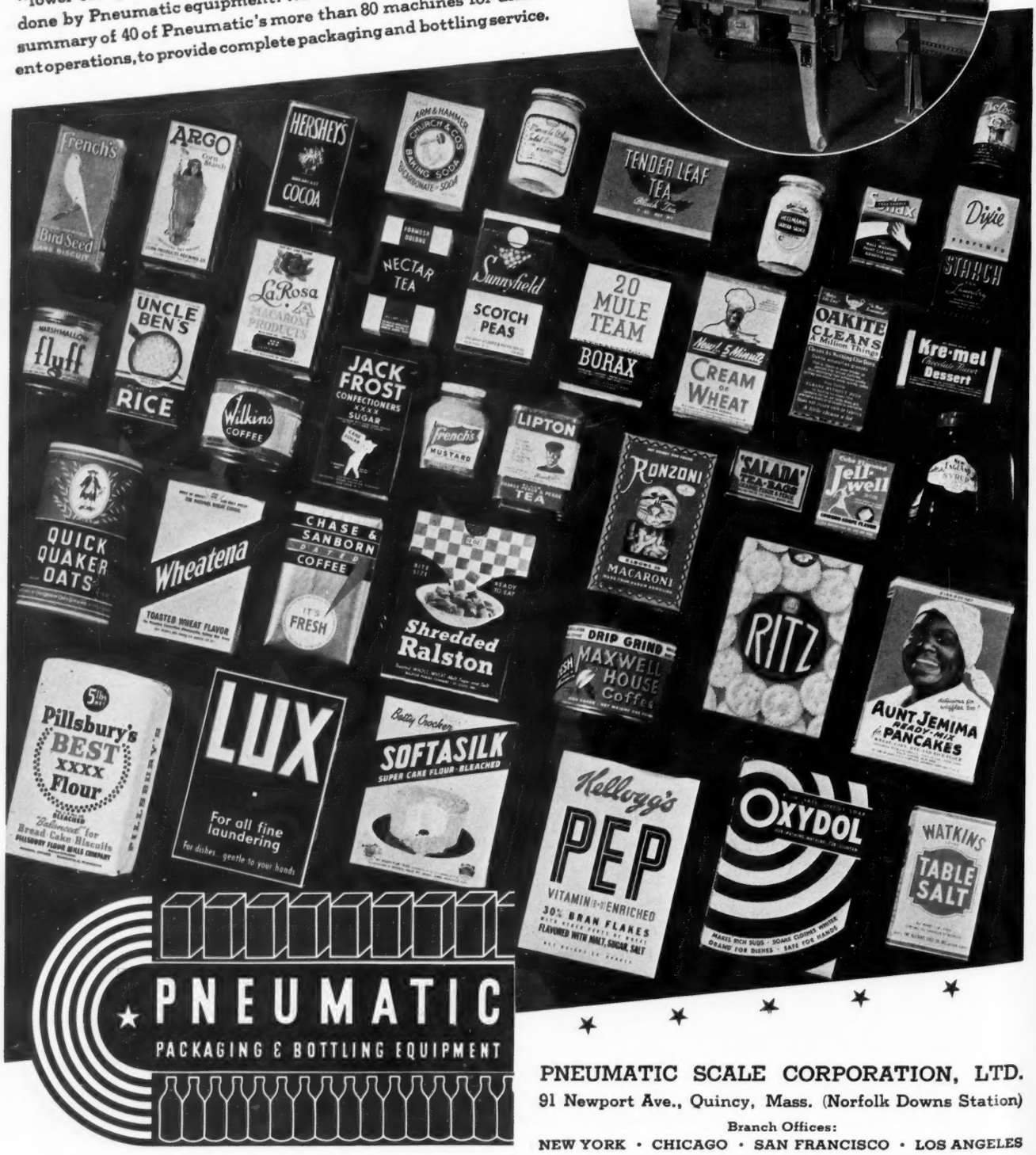
1940 Frozen Foods Directory

McGRAW-HILL PUBLISHING COMPANY, INC.

WHO DOES AMERICA'S PACKAGING?

Hardly a single famous name is missing from the complete list of nationally known packaged products handled by Pneumatic machines. Only one conclusion can be drawn from this fact—industry is completely sold on the economy of Pneumatic's "lower cost per container operation" and on the quality of work done by Pneumatic equipment. Write for Bulletin 100—a picture summary of 40 of Pneumatic's more than 80 machines for different operations, to provide complete packaging and bottling service.





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★HOMES OF FAMOUS FOODS

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In THIS *Issue*

• COURAGE FROM VITAMINS

Military disasters in history indicate that people who suffer from a deficiency of vitamin B_1 have no stomach for a fight. Perhaps this has something to do with Britain's decision to fortify bread with vitamin B_1 and calcium. At any rate, the methods and quantities involved in the fortification process are practical information for American food manufacturers. Page 37.

• TAKE A TIP FROM THE OYSTER

To the layman, opening oysters would seem to be at least one occupation that did not lend itself to straight-line, mass production methods. But such is not the case. General Foods Corp., through its subsidiary, Bluepoints Co., Inc., has put oysters on the assembly line at its new plant in Greenport, N. Y. And what they have done carries many suggestions for other food manufacturers. Read the story by Bluepoints' president, Paul O. Mercer, on page 40.

• NOW YOU NEEDN'T GUESS

There are so many different kinds of filters on the market that sometimes it is difficult to tell which is "it" for a particular job. When that happens, the best thing to do is to analyze the filtering job and determine how its requirements fit into the basic principles of design of the different types of filters. What these principles are is told by H. S. Metzger and A. I. Kegan on page 47. The authors also give a handy filter-selection table.

• ONLY ONE IN EXISTENCE

A sizeable slice of this issue is devoted to the 1940 edition of the Frozen Foods Directory, the only catalog of the freezing industry published anywhere. In those pages you will find not only the names and addresses of companies freezing food and of the major distributing companies, but also locations of the freezing plants, brand names, products frozen, containers used, systems of freezing and production figures for 1939, 1940 and 1941 (anticipated).

This Directory was compiled from reports to Food Industries. Its purpose is to present a much needed complete picture of the freezing industry and to make it easy to contact sources of supply.

A word of caution about the production figures. There are some duplications in the figures of packers and distributors. In making the summary given on the front page of the Directory, Food Industries attempted to eliminate the duplications. If you think the elimination of duplications is not a tough job, try it some time.

There was also the little matter of trying to determine just where the dividing line comes between slow and quick freezing. There are different viewpoints on what is quick in the freezing industry. Page 61.

In FORTHCOMING *Issues*

• HITLER'S SECRET WEAPON

How does the German army keep up the energy of the troops? Does it feed them with some "anti-fatigue" substance? What has been the role of the food technologist in subsisting the powerful German war machine? You will want to read this forthcoming discussion of the subject of army foods. While it is perforce based on fragmentary information, it may surprise you to learn the changes that have taken place.

• TO FORTIFY OR NOT?

To restore or not restore vitamins; to fortify or not to fortify our commercially produced foods with vitamins. There's a big policy question for many a food manufacturer. And it is not as simple as it sounds, for there are some very complicating factors. For one, there is Miss Harriet Elliott of the National Defense Advisory Commission who has surrounded herself with several persons who seem to believe that if the world would only do as they order, it would be a wonderful place. Gossip has it that they want to compel all food manufacturers to fortify all manufactured foods with synthetic vitamins at no added cost to the consumer.

You can't escape if she has her way. You will want to read the analysis of the pros and cons by one who has done a lot of studying about this new problem.

• BOMBS RUIN BISCUITS

After an air raid in Great Britain the cakes in an oven were burned, so the enterprising baker put them on sale as "Siren Cakes," and they sold! Perhaps you have often wondered what occurred in a food plant over there during aerial bombardments. It's a bit different from what you might guess, and we shall soon give you all that the censor didn't slice out of the manuscript.

• SOMETHING TO THINK ABOUT

Sifting is an operation that seldom receives the attention it deserves. But a recently arrived French milling expert will discuss some of the fine points and show the theoretical basis on which European millers reduced the sifting surface by as much as 30 percent. He also shows how to determine the grading precision of a sifting operation. Though primarily of interest to millers, bakers, malsters and brewers, a canner or freezer of peas or lima beans will wonder about his own graders after reading it.

FOOD INDUSTRIES
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The Talk of the Industry

» FLESH of dogs will be legalized meat in "Greater Germany," according to a decree effective Jan. 1, 1941. It is to be hoped that crow will soon be added to the German dietary.

» IT BEGINS to look like old times again when Bethlehem Steel announces unfilled orders of more than $1,100,000,000. Though this is an enviable position, food manufacturers can console themselves that just about 25 percent of that amount will find its way into their treasuries, for the average family budget calls for expenditure of about 25 percent of income for food.

» ONE OF THE obscure but curious trade items that may have escaped your attention is the sudden export demand for caffeine. While the current contract price has been $2.60 per pound for U.S.P. caffeine, exporters have been offering up to $3.60 with but few sellers.

Though the ostensible market for caffeine is world wide, one suspects that the unexpected demand originates in Germany. Some day we hope to publish more on this point; but in the meantime, if it interests you, turn back to July, 1940, FOOD INDUSTRIES and read "'Needling' the Ersatz Coffee" on page 96.

» CONSIDERABLE hullabaloo was raised last summer when the "draft industry" amendment to the selective service bill was tacked on. However, second thought on the matter indicates that there is really little to get excited about. The amendment itself is milder than the similar law enacted during World War I; and that law never caused industry in general, much less the food industries, any particular trouble.

This time, with practically everyone cooperating wholeheartedly in the defense program, the "industrial draft" law is not expected to result in undue hardships. Perhaps it had best be considered as a cyclone cellar constructed by some members of Congress who feared the winds of displeasure from the folks back home.

» WATCH the size of the world wheat crops as an index of things to come. The 2 percent decrease recently estimated by the U.S. Department of Agriculture is news of great importance. Production is estimated for 1940–41 as 2 percent below 1939–40 and 8 per cent below 1938–39. On the other hand, it is 11 percent above the 5-year average ended with the 1937–38 season.

One of the strange, nay erratic, phenomena of world affairs is that when the world as a whole is only 90 days ahead of starvation there is prosperity as a rule; and when the world gets 180 days ahead of starvation then there is world-wide depression, according to a German economist of the Pre-Hitler era.

» IF A FOOD MANUFACTURER wants to gain some advantageous publicity, let him put out a carefully worded statement at the time the annual report is sent to stockholders. Let this statement show what part of the net income

is paid out in taxes. Generally it will amount to half or three-quarters of the income. It is unwise to wait for the public to begin howling about the high cost of living which is certain to occur in 1941. Better begin now to get ready for it.

» OLIVE GROWERS of Tulare County, California, have ganged up in "pools" and have forced the free market price for olives for oil pressing from $55 per ton to $65 for Manzanillos and $70 for Missions. The price rise is attributed to cooperative action.

Maybe so, but one suspects that the war in the Mediterranean has a lot more to do with it. Now the talk is of building more oil crushing plants. Yet, as soon as the war is over there will be loud cries for tariffs to protect these new plants from the inroads of low-cost foreign competition.

Amazing Growth Of Locker Plant Freezing

A BYPRODUCT of the work of preparing the Frozen Foods Directory for this issue has led us to observe that the most striking recent fact about the preservation of perishable foods by quick freezing is the rapid development of the semi-commercial freezer commonly known as the locker plant. As recently as five or six years ago it was a commercial curiosity. Today the volume of locker plant freezing in the United States has been estimated to be roughly 400,000,000 lb., of which about three-quarters is meat. Thus the volume of foods preserved chiefly for home use in the thousands of small locker plants throughout the country is almost as great as the industrial production of quick frozen foods.

A rapid growth of volume, such as this, paralleling the industrial volume both as to rate and amount of food preserved, is a factor in food production and distribution that cannot be ignored. Its significance, though not clearly discernible today, is some day likely to crash in on our business lives with the unexpectedness of the proverbial thunderbolt from the blue. It is an astonishing development.

Farmers Face Loss of Premium

UNDER the title "Farm Practices May Be Changed," the University of Tennessee *News Letter* says:

"By eliminating the importance of seasons in food production and marketing, frozen foods can alter many of the present farm practices. No special premium will be placed on the first crop of fresh strawberries when fresh strawberries can be purchased the year round at reasonable prices. Early production of any food is of no particular interest to the frozen food industry as far as quick frozen foods are concerned.

"Southern farmers may be handicapped by this characteristic of the new industry, since climatic conditions have put the South a step ahead of farmers in other regions in marketing seasonal fresh foods. Northern farmers promise to become more serious competitors of the traditional 'nation's food basket'; the South will have to look to other advantages besides early production in retaining its present income from farm products. . .

"With seasons no longer important, quality will become the dominant factor in farming. . . . "

Additional comment here is superfluous, except to compliment the university for wise deductions and very sound advice to farmers.

One Meaning of the Election

DESPITE the obvious fact that FOOD INDUSTRIES is a technical periodical, and the further fact which is perhaps not so obvious, that matters political are not a matter of technological concern—yet, there are certain aspects of the recent election that deserve study and comment. Readers occasionally protest that politics has no place in our pages. Which is true if by politics you mean the art of winning elections. But if the broader definition is used—that politics is the art of government—then the subject deserves some consideration. For, as we have repeatedly remarked, business does not operate in a political vacuum however much all of us would welcome it.

In the November general elections a distinct majority of the people voted for a continuation of national policies of the past seven years. So be it. A very important feature of those policies has been the reciprocal trade agreements, particularly with South American nations. Though the current period is one of great potential danger in a military sense, it is also one of great potential opportunity. The opportunity is one to be grasped and developed. Many South American republics are in acute economic distress as a result of the war. Exports to Europe have almost ceased and the repercussions are felt everywhere.

To illustrate: The Central Argentine Railway has found it necessary to issue a staff memorandum saying, in effect, that in order to keep on operating, buy coal, and so forth, it may soon be necessary to delay payment of salaries, largely because of 4,000,000 tons of corn that cannot be shipped. There is no place where it can go.

Beef, coffee and other commodities are in a like predicament in Argentina and other countries.

If the United States is to continue the Good Neighbor policy and develop the potential opportunity of the times,

Hors d'Oeuvres

• According to the English chief engineer on one of the U. S. destroyers sent to Britain, the best things aboard the ship were the preserved fruits and the fine balance of the propellers. American skill runs all the way from steel to strawberries.

• *The Navy last month bought from Haas Bros., San Francisco, $103,219.30 worth of canned salmon—about half a million cans of "goldfish" for the boys in blue. And we hoped those days were gone forever.*

• A refugee German chemist, Leo Katz, recently demonstrated to subsistence officers of the Army, Navy and Marines a ration can which heats itself by chemical reaction. Blitz beans, no less.

• *'Tis reported that soda fountains will serve cider squeezed from apples while you wait. Jersey "lightning" without a flash.*

• From American Meat Institute comes a story of a business girl who says: "My strength gives out in the afternoon. What's the matter with me?" We thought we knew the answer, but we were wrong. She didn't eat the right food.

• *A papaya peeler has been patented.*

• Down through the ages since the days of Emperor Augustus Caesar, asparagus has been a rare delicacy favored by royalty. Now asparagus is just as common as royalty.

• *Veal canned for the 1824 arctic expedition of Sir William Perry was found in perfect condition when opened recently at the museum of Royal United Service Institution in London. You can't say the British didn't save it for a rainy day.*

• The presiding officer at a recent convention introduced a speaker with this remark: "I have known Mr. X who will speak to you now over a period of many years." And it seemed like the truth.

• *American Institute of Baking has issued "New Glamour Recipes Featuring Bread." That's putting the Mae West twist on rolls.*

• Uncle Sam ordered from National Fruit Products Co., Winchester, Va., $12,000 worth of applesauce. That was during the election campaign.

• *The Japanese have placed their principal food, rice, under State control as a war emergency measure. 'Tis a cloudy day in the Land of the Rising Sun.*

• In one year meat packers in the United States detached from slaughtered sheep 37,225,172 lb. of wool. Yes, the packers pull a lot of wool, but not over anyone's eyes.

• *Halt! See! and Hear! National Peanut Week will be held beginning Jan. 23. Fifty thousand tons of peanuts will be distributed! Nuts to everybody!*

F. K. L.

then we must help international trade to develop. Artificial restrictions must be removed or the Axis powers will find a too receptive people.

Congressional restriction on purchase of Argentine corn beef by the U.S. Navy and use of the foot and mouth disease quarantine as a trade barrier against South American meats, rather than as a bonafide sanitary regulation, are the type of short-sighted actions that block Western Hemisphere trade solidarity.

If there be squawks, let it be recalled that this is what the majority voted for. And those who voted for a continuance of previous policies should be the first to embrace the opportunity to develop Latin American trade—and make the necessary sacrifices.

Time to Think Ahead

SOME very high-minded plans have been announced by industry, calling for giving various sums of money to men called into military service—a worthy effort to cushion the shock of a much lower rate of pay in the Army than they previously earned. Such plans go all the way from a sort of bonus on departure up to a public promise on the part of industry to make up the difference between a man's civil pay and his army pay. All of which is splendid, and it is to be hoped that all such promises will be made good. It will be cruel, however, if a concern has a change of heart or finds that it cannot afford to keep up the promised payments.

Without in any way detracting from the generous impulses that prompted these public manifestations, it is however, advisable to examine the matter more closely. For one is apt to suspect that many such promises of generosity may turn out to be of no greater endurance than the cries of bystanders when troops were marching to board ships to join the AEF back in 1917–18.

"When you come back, boys, nothing will be too good for you."

They meant it when they said it. But enthusiasm cooled by 1919. And in 1920, the fact that a man had done military service was more often a detriment than an asset.

Things will be different this time—different in a host of ways. It is the law that men *must* be reemployed after their military service is over. The law does not, however, say that a man must take his old job back. If there should be no war involving the United States, many of these men will come back to their old employers in good healthy condition, and many of them will be better equipped with education, discipline and mechanical training than when they left. But they may be very restless on indoor, confining jobs.

Should there be a war the picture will be entirely different. After the fiendish excitement of combat, especially fighting that lasts for many months, a demobilized soldier is very likely to be undergoing mental upheavals which cannot be comprehended by those who have not experienced it. To expect such a man to resume a civilian job with his former efficiency is to expect a miracle.

War does things to men. And it takes many months of peace to adapt them to peace ways. The law says you must reemploy them when they come back. Failure to reemploy a returned soldier carries a heavy penalty. And, war or no war, men coming back are bound to be restless, irritable and in need of excitement or diversion for some time.

Some of them will try your patience until they are finally adapted to peace ways again. Some of your best men today will come back with a temporary viewpoint that may not quite meet your own ideas of what is good and proper. But the law requires you to reemploy them. Hence, would it not be wise to set aside a fund at this time to be used to reemploy the returning soldier at a time when he will need it a whole lot more than he needs it today? Provided always that profits and the tax laws permit it, such a reemployment fund will be far more useful in a social sense than impulsive generosity today.

Standard Size Packages Needed for Army Food

ARMY BUYING of foods from our industries is going to be a significant item of business during the next few years. Packaging of these foods will be an important part of the problem, both for manufacturers and the military authorities. It is a problem to which the manufacturers should contribute their experience and good sense. The Army will welcome this aid and the result may be beneficial to both parties.

Many commercial packages for wholesale distribution are not altogether suitable for Army camp and field use. Sometimes it appears that they are none too suitable for normal peacetime distribution. The present occasion, therefore, gives excellent opportunity for improvement of both sizes and types of package. The result can be made of permanent benefit to the industry if proper selection is arranged at this time in the negotiations with Washington.

Washington understands, and industry should appreciate, that the Army would like, whenever it is suitable, to buy an ordinary commercial type package of wholesale size for Army use. The Army wants this arrangement because it permits shifting of normal manufacturing and packaging equipment from routine to military service with minimum of delay and a minimum of extra cost to the government.

Now is the time for industry action. Where the Army is asking for packages that are not suited to normal usage, steps should be taken promptly to determine whether this special packaging is necessary or merely a relic of some former Army practice that could very well be changed. (One instance of progress is the recent adoption of the gallon glass container for vinegar instead of the old wooden keg.) Manufacturers should bring unnecessary variance to the attention of the Washington officials. Washington will welcome suggestions. And changes in plans for purchase can still be made where the mutual advantage is evident.

Fortunately, Washington has put in charge of this job an experienced industry executive. If there are difficulties which the routine specification offices and purchasing departments cannot solve they will, and should be, promptly referred up to Mr. George M. Moffett. He and the coordinator of purchases, Mr. Donald M. Nelson, have both the authority and the skill to work out any changes promptly. But to start each case on its way toward adjustment is a job for the industry. It is to be hoped that it will not be a neglected responsibility until too late.

The Right Way To Proceed

A VERY commendable job has been under way for the past three years by the Kansas Wheat Improvement Association in its efforts to eradicate undesirable varieties of wheat and to educate the farmer to grow only the varieties that are acceptable by millers and bakers. Any activity in this direction is worth while, whether it be in Kansas or elsewhere, or whether the crop be wheat, barley, corn, hogs, beef, grapes, tomatoes, strawberries or whatnot. For it is only common sense to produce what the user really wants; and it becomes very good business if, at the same time, the quality as well as variety produced are so excellent that commercial buyers will pay a premium for them.

Crop improvement is commendable, not only because it helps toward solving the farm problem, but because it

helps to solve the problems of the food manufacturer as well, whether these be technical or economic problems. The policies followed by the Kansas group are also commendable because they secure the cooperation of the most interested parties, the elevator operators (who are the primary buyers), the flour millers and bakers, as well as the farmers.

In days gone by, in other states wheat improvement work that omitted the needs of the buyer and failed to secure his cooperation resulted in ludicrous failure. One case serves to illustrate the error that Kansas has wisely avoided. After long research and development, two new types of wheat were developed and quietly "sold" to the growers of a state as being the final answer to their wheat growing problems. Yields were very satisfactory, and the grain was not only resistant to disease, but it also could be grown between certain dates when it would avoid insect ravages. In short, it was theoretically just about perfect—except that the flour millers hated it and docked the farmers severely when they bought it at all. Of course, there was hell to pay, and to say that relations between farmers and millers were strained is decidedly an understatement.

The difficulty of the flour miller in that lamented day lay in the impossibility of producing a merchantable flour from the new wheats. These were a mixture of hard, flinty grains and soft grains which made it impossible to set the mills to do a good job on both at the same time. Millers who bought any of the undesirable wheat converted it into paste flour which brought a very low price indeed. Hence, the penalizing of the growers. Cooperation with the buyers of the raw material would have avoided the foregoing difficulty.

It is a sign of better things to come when agriculture is beginning to adopt the common sense principles of successful marketing and adapts its production to the buyers' needs.

Criminal Prosecutions Likely To Increase

IN FOUR recent cases under the new Federal food law, where heavy penalties were assessed for criminal violation of the law, three of them appear to be due to absence of food technologists or of any real effort at quality control:

1. A dried fruit company got nicked for $500 for filthy dried prunes and two executives had to shell out $150 each.

2. A catchup manufacturer paid a $200 fine but, luckily, action against the responsible executive was dismissed. The trouble originated in "decomposed" catchup.

3. An individual trading as a creamery company sold low-fat butter in interstate commerce and he had to pay $500 for his lesson about the need for quality control.

4. In this case an individual was socked $400 because cream for butter making was found to be adulterated with mineral oil. He got off very easily, considering what the judge might have done under the law.

One has no sympathy for the latter, but the first three probably failed to understand that there is an economic reward for good quality control.

If the political signs of November are not deceptive it is to be expected that there will not be a decrease in the number of prosecutions under the criminal section of the law. Enough said.

Britain's Bread

GREAT BRITAIN'S plan to add vitamin B_1 and a calcium salt to all bread for the British people in 1941 is related elsewhere in this issue. Yet, despite the sponsoring of the move by the Ministry of Health, acting on the advice of Prof. J. C. Drummond, Dr. T. Moran and other scientists, there exists some opposition to this move. As *Food Manufacture*, our British contemporary, remarks editorially, "The Bread Controversy Continues." It continues, not because of any opposition to adequate amounts of vitamins in the diet, but because many experts decry the restoration of B_1 to wheat products as long as the wheat already had them before milling. Those holding to this viewpoint prefer to utilize higher percentages of extraction of flour from the wheat berry, even to the point of using the entire grain, producing what is known in England as "wholemeal flour."

Against that viewpoint is the problem of those who must consider the problem of Britain's food supply as a whole. For animals must be fed as well as human beings, and the byproducts of flour milling are important sources of animal feeds. If the flour extraction nears 100 percent, then the problem of adequate feed supplies becomes aggravated. And unless the livestock of Britain is to be slaughtered, there is the continuing need for other feed sources. While we are not informed of all that has entered into the decision, we suspect that economic matters, quite as much as science, motivated the decision. For vitamins can be synthesized, but foods and feeds must be grown.

On the calcium angle of the controversy the debate is centered on scientific aspects of the problem. Professor Drummond's idea is to keep the calcium:phosphorous ratio up to what he regards as proper and adequate. In this theory he is opposed by Prof. Harris, a medical man of Liverpool, who asserts that overdosages of calcium may be very harmful to certain individuals and says that, unless the British Medical Research Council has evidence to show that calcium additions are needed, then it is the Council—not bread—that needs reform.

The American food manufacturer and food technologist will follow this huge national dietary experiment with much interest, for in the United States there is an increasing public belief in the need for more adequate supplies of vitamins in our dietary.

Why Women Open Packages Improperly

WHY WOMEN will not heed the printed directions for opening packages and containers is a question to which many a sales manager would like to know the answer. They want it because they hate to see their own pet packages in hopeless disarray in a housewife's pantry where access to the contents has been gained by sheer force and awkwardness. Nearly every sales manager complains that women will not follow the directions for easy and proper opening.

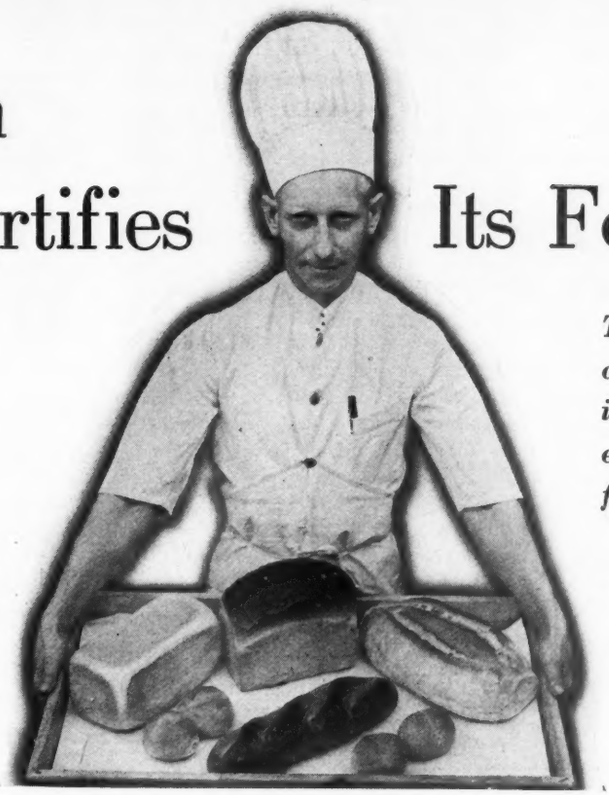
No careful observer can deny that such directions are generally disregarded. But we have observed that on nearly all packages having special opening features, directions are printed so small that it is difficult to read them. Also that the average woman simply will not wear her eyeglasses unless she is compelled to do so, and the usual household duties of a woman do not require glasses.

Most sales managers are old enough to appreciate the old gag about buying glasses because one's arms are not long enough. People whose vision is otherwise perfect usually need glasses for reading as the years pass by. But unless women actually require visual correction under all conditions they will not wear their glasses continuously. Now apply this to package directions. Isn't it true that there are vastly more women over 30 doing the family cooking than under 30?

What has this to do with directions for opening packages? Simply this: Such directions should be printed in a type face large and bold enough to be read within 15 in. of the eye, without spectacles, by a person of 50.

Too many packages are designed for the sales manager and top executives—not enough are designed for the consumer in the middle-age group.

Britain Fortifies Its Food



Into these standardized forms of bread, Britain will put vitamin B_1, and calcium. Ordinary bread is sold only in these standard shapes, by government order. The purpose is to economize on labor and baking capacity and to reduce waste.

To add vitamin B_1 and calcium to bread. People suffering from vitamin B_1 deficiency have no stomach for a fight

By Special Correspondence from London

British Combine photo

WHEN Robert Boothby, Parliamentary Secretary to the Ministry of Health, made his maiden speech as a member of the government, he sprang a startling surprise on Parliament and people alike. He announced that the government intends to "fortify" white bread by the addition of synthetic vitamin B_1 and calcium. A fifth of a gram of B_1, in the form of aneurin (known as thiamin chloride in the U.S.—Ed.), the pure crystalline vitamin, and 100 grams of calcium will be added to each sack of flour at the mill or, in the case of imported flour, before distribution to bakers. Experiments, it is claimed, have shown that aneurin is completely inert, and it will have no effect on the dough, the volume of the loaf or the consistency of the crumb; it is stable, and there will be no loss in doughing and baking. The "dose" of aneurin will be mixed with ½ oz. of flour, and this concentrate added to the sack of flour. Machinery for the proper admixture of this small quantity is already in existence, while the thiochrome test for proper admixture is claimed to be accurate within 4 percent.

The present cost of aneurin in Great Britain is about £3 a gram wholesale, or about £1,360 (over $5,000) a pound. On this basis, the measure would cost some £12,000,000 a year. A large factory for the production of aneurin on a mass basis, however, is now in course of construction, and this is expected to come into production in January, 1941, when costs will naturally be appreciably diminished. In the meantime, sufficient stocks of aneurin are on hand to allow the distribution of "fortified" bread in certain selected areas. According to Mr. Boothby's estimate, the cost for the addition of aneurin on the completion of the new factory will be in the nature of 1/20th of a penny per 2-lb. loaf. (In U. S. currency this equivalent to slightly less than 1/10 of one cent.)

The adoption of "fortification" is not primarily a war measure, although the advent of war, and the inevitable restrictions on consumption of certain foods has increased its importance. Research work in connection with the addition of B_1 to bread was commenced over four years ago by the Advertising Committee of the Millers' Mutual Association. The committee, as a result of its contacts with nutrition experts during its "Bread for Energy" propaganda campaign, had been convinced of the importance of B_1 and of the deficiency of white bread in this connection. On the basis of this research, in which the Research Committee of British Flour Millers assisted, definite proposals were made which, after approval by the government's Scientific Food Committee, were officially adopted by the government.

The symptoms of a deficiency of B_1 have been known since 1897. A startling demonstration of the widespread effects of B_1 deficiency was shown in the Russo-Japanese war, when there were 200,000 cases of beriberi in the army and none in the navy. The rations were approximately the same, except that the sailor's ration contained aproximately 10 oz. of whole barley, which contained the preventive factor.

In the World War, the British troops who capitulated at Kut were suffering from beri-beri due to a deficiency of B_1. The Indian troops in Kut who ate "atta" and "dahl" (wholemeal flour and chickpea) did not have the disease. And in the later

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This article on
FORTIFYING FOOD
Is of interest to
All Food Manufacturers

Because the war-time emergency in Great Britain is accelerating a development that is taking place more slowly in the United States. In our country we prefer to call it vitamin restoration because the vitamins are originally present in the raw material and are partially lost in processing. You will want to follow this national-scale experiment.—THE EDITORS.

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stages of the siege certain of the English troops recovered from beri-beri as a result of eating the Indian rations when their own white flour was exhausted.

The Italians also suffered severely owing to inadequate diet, and the collapse at Caporetto was heavily influenced by this factor. They profited by the lesson. Sir Aldo Castellani, the Harley Street physician, who was Mussolini's chief medical adviser in the Abyssinian War and who has returned to Italy to help him in the current war, has revealed the remarkable health record among Italian troops in that campaign. Only one case of beri-beri was due to deficiency of B_1, and that developed after the termination of the war and was treated in Rome.

In this present war, the Germans, according to reports, have supplied their troops, about to go into battle, with pure vitamin B_1 to give them energy and courage. Whether this use of B_1 as concentrated "dope" is effective or safe is open to question.

With smaller deficiencies of the vitamin, more subtle symptoms are shown. Sir Robert McCarrison showed in 1918 to 1919 by experiments on animals that a deficiency of B_1 caused diseases of the alimentary tract. In a lecture to the Royal College of Surgeons in 1931, he said: "Of all the faulty diets I have used, that composed of white bread, margarine, tea, sugar, jam, preserved meat and scanty, overcooked vegetables—a diet in common use by many people in this country—proved to be one of the worst and most likely to be associated in rats with many of the morbid states I have mentioned, especially diseases of the lungs and the gastro-intestinal tract."

An important aspect is the psychological effect of B_1 deficiency. Sir John Orr, in "Feeding the People in Wartime," states: "An outstanding characteristic of this form of malnutrition is nervous debility and lethargy. There is a saying in the East which expresses the progressive psychological deterioration of those suffering from this dietary deficiency: 'It is better to walk than to run; it is better to stand than to walk; it is better to lie than to stand; it is better to sleep than to wake; it is better to die than to live.' People suffering from even a minor degree of deficiency of vitamin B_1 have no stomach for a fight."

While there is general agreement that vitamin B_1 deficiency occurs fairly widely in Great Britain, there is less agreement as to its seriousness. In the first place, no definite figure can be given for the average man's requirements of B_1. The League of Nations' Technical Commission on Nutrition estimated that the average requirements of B_1 for an adult man were 300 International Units (I.U.) a day. Later research has tended to increase this figure, and the most recent survey, published by T. Moran and R. G. Booth after the government announcement, gives 700 I.U., assuming average energy requirements of 2,810 calories for whole population, or 420 I.U. if the children and pregnant and lactating mothers are excluded. The consumption of bread varies widely, and in the last war reached from less than 4 oz. a head for the wealthier income levels up to 1½ lb. per head per day for manual workers.

Straight run flour (73 percent extraction), as used at present, contains an average of 0.30 I.U. of B_1 per gram, against 0.75 and 1.3 grams, respectively, for 85 percent extractions and genuine 100 percent wholemeal. The 1-lb. loaf made from white flour of about 70 percent extraction gives 80 to 160 I.U. of vitamin B_1, while that made from flour of 80 to 85 percent extraction would give 300 to 450 I.U. Here again, however, the B_1 content of flour may vary from 0.6 to 3.3 I.U. per gram according to the type of wheat used.

In view of the many variables involved, it is probably impossible to get any closer than the round figure of 300 I.U. a day put forward recently as an estimate of the average intake of B_1 in this country; this figure would seem to be borne out to some extent by Sir John Orr's estimate in 1936 that half the population was below the deficiency line, and Moran and Drummond's very recent confirmation that not only was this so, but the remaining 50 percent was only just above it.

Moran and Drummond estimate that the proposed "fortification" of bread will add 100 I.U. to the average daily intake of B_1 and ensure an average daily intake of 0.60 grams of calcium. On the above figures, this should bring the average intake up to the standard line, while efforts to increase the consumption of bread will, no doubt, also affect the lower consumption levels.

In announcing the government's decision, Mr. Boothby claimed that it would "be hailed by scientists all over the world as a great advance on anything ever yet achieved in this field." Actually, it is more than that. It is obviously the first step in a scientifically planned national food policy. Mr. Boothby knows the value of vitamins; before he took office, he was managing director of a company that manufactured them. (He has now, under British law, severed all connections with the company). He directly fostered the addition of vitamins to margarine, and today "Marcom," the one pooled brand of margarine on the market, is now "fortified" with vitamins A and B to give it the vitamin value contained in good summer butter.

Further developments of this policy are of necessity shrouded in secrecy. A number of pointers, however, may be noticed. In a recent book, "Science

(*Turn to page* 107)

British Combine photo

A British family has its dinner in a community kitchen in Britain. Community feeding reduces waste, one of England's problems. Another problem is to improve the quality of the diet of the masses, which is why vitamin B_1 and calcium are being added to bread. This is important to Britain's continued unflinching resistance.

This machine alternately applies vacuum and pressure to cans of coffee, reducing the oxygen content in the cans. When the can is sealed it contains inert gas under pressure

Goes Vacuum Pack One Better

Applies vacuum-pressure cycle to reduce oxygen content in can to few parts per million. Process keeps coffee longer

INTRODUCTION of the vacuum-pack process for packaging coffee greatly extended the area of the market which could be reached from a coffee roasting plant, because vacuum packing retained full coffee flavor longer than any previous method of packaging coffee. Pressure packing coffee by the new "Tone" process, according to claims, maintains the flavor of packaged coffee even longer. This method is that of Tone Bros., Des Moines, Ia.

The theory of pressure packing by the "Tone" process is in reality an extended application of vacuum packing. Within an hour and a half of roasting coffee is weighed into cans and fed by conveyor to the processing machine. This machine subjects the coffee to two alternate applications of vacuum and pressure.

The machine consists of 20 vacuum-pressure bells around a vertical axis, with a movable table under each. These tables raise and lower the can and lid into the bell by cam action. The whole device rotates, discharging the sealed pressure-packed cans when the operation is complete.

Filled cans with covers in place are fed onto the tables and raised into the bells, where the covers are lifted by magnets. High vacuum is applied for 8 seconds, followed by pressure for 4 seconds to 4 lb. gauge (18¼ lb. absolute). A second vacuum application lasts 11 seconds, followed by a second pressure application of 4 lb. for 4 seconds.

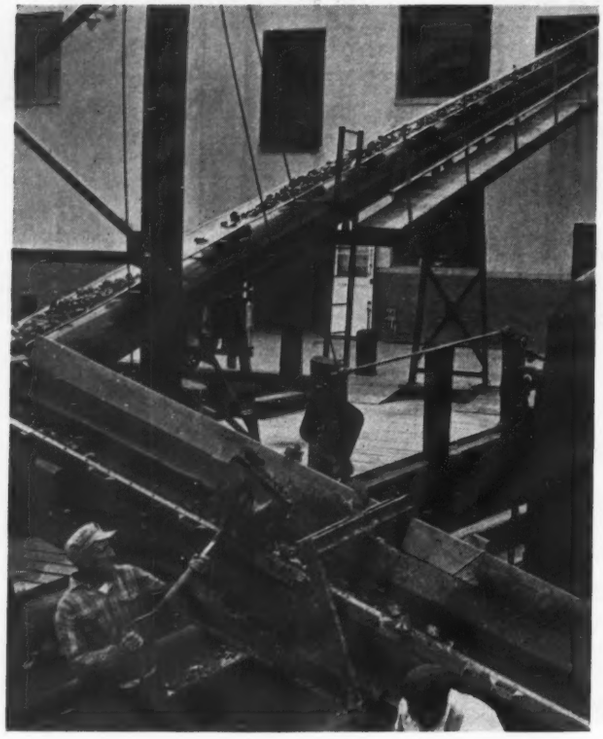
The gases used to replace the exhausted air are produced in a generator which delivers a gas mixture of 80 percent nitrogen and 20 percent carbon dioxide and carbon monoxide. The latter are the gases given off by the process of roasting coffee. Apparently, the higher the carbon monoxide content, the better the packing result, as revealed by cup testing. Pressure-packed cans are sealed at a pressure but slightly above atmospheric. Exuded gases in the course of a few days build up a pressure in the can of several pounds.

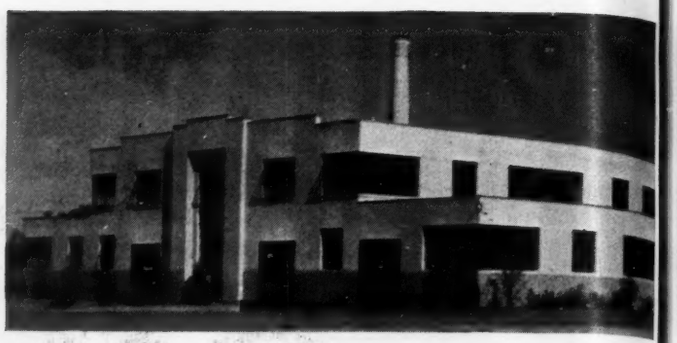
The mathematics is as follows:

With a barometer reading of 29 in. of mercury and a vacuum pump pulling 28 9/10 in., $\frac{28.9}{29}$ of the air is removed. Therefore, $\frac{1}{290}$ of the original air remains. Application of inert gas at 4 lb. (gauge) pressure raises the absolute pressure to 18.24 lb. (14.24 plus 4). When the pressure again drops, $\frac{4}{18.24}$ of the remaining $\frac{1}{290}$ portion of air is removed, leaving 0.002692 of the original. Reapplication of vacuum and pressure theoretically reduces the air content to 7¼ parts per million.

The theoretical is not attained in fact. Nevertheless, delicate gas testing apparatus usually indicates no oxygen, rarely even a trace.

With shovels the crew unloads an oyster dredge and the oysters start their journey through the modern, sanitary packing processes of Bluepoints Company's plant.





MASS PRODUCTION METHODS PUT TO WORK

General Foods Corp. combines straightline production with plant sanitation and employee comfort in world's largest oyster packing plant.

By PAUL O. MERCER
President, The Bluepoints Co., Inc.
Greenport, N. Y.

MECHANIZATION to the highest practical degree and straightline product flow characterizes the new oyster packing plant of Bluepoints Company, Inc., General Foods subsidiary. Beginning at the unloading dock, and carrying through to shipping of the various types of filled containers, the oysters move on handling equipment carefully chosen to suit the particular operation involved.

Bluepoints Co., Inc., has operated plants for a long time at West Sayville, N. Y., East Providence, R. I., and South Norwalk, Conn. The company has also had extensive oyster beds in Gardiners Bay and Peconic Bays at the eastern end of Long Island. These formerly served the plant at South Norwalk, necessitating a long trip between oyster beds and packing plant.

To do away with this trip and to permit harvesting of oysters in even the worst of winter weather, the new plant, which is the largest oyster plant in existence, was erected at Greenport. This town is in a sheltered location at the northwestern point of Gardiners Bay, with ready access to Big and Little Peconic Bays and other adjacent waters suitable for oyster culture. The oyster beds start just outside the channel leading to the unloading dock and are scattered throughout the surrounding waters, in sheltered but ice-free locations that permit harvesting in even the coldest weather.

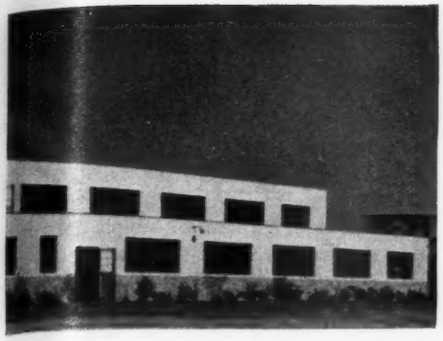
Six oyster dredges serve the plant, plying between the oyster beds and the unloading dock throughout the daylight hours each day during the oyster season. This unloading dock consists of two piers, each equipped with two pivoted belt conveyors for unloading the dredges, one on each side. Thus four dredges can be unloaded at one time, if desired. Unloading capacity is 1,200 bu. of oysters per hour.

Oysters are shoveled from the deck of the dredge onto the unloading conveyor by hand, by the crew of the dredge. Each pier is equipped with an inclined belt conveyor which leads to the second story of the main, two-story plant building. The pivoted unloading conveyors move the oysters up out of the boats and deliver them to the inclined conveyors.

From the inclined conveyors, the oysters pass to long horizontal belt conveyors placed over the open tops of two concrete bins, each 110 ft. long. These bins are divided into compartments and the compartments are filled from the conveyors by means of traveling shuttle conveyors.

Packing Shell Oysters

The cull bin extends through from the second floor of the plant, as shown in the photograph of the barreling operation, which shows the V-shaped hopper bottom of the bin. There are 60 working stations along the bottom of this bin, 30 on each side. These stations consist of open-



At Greenport, L. I., Bluepoints Co., Inc., has erected the largest of all oyster packing plants, producing selected and sized barreled oysters in the shell, four sizes of oyster meats in cans and Birds Eye quick frozen oysters. Note the truck loading platform at the front of the building, arranged to bring the floor of the truck body and the shipping platform to the same level.

ings with adjustable doors, which permit the oysters to fall from the bin onto a concrete work table extending along the bin.

Here the workers separate clumps of oysters, cull out those unsuitable for shipping in the shell, scrape off any algae, seaweed or mussels adhering to the shells and then separate the oysters into six grades.

As shown in the photograph, wooden work tables are placed between each two workers at the cull bin. On these tables are placed wire baskets. Into five of these baskets go the five commercial sizes of shell oysters, as follows:

Small.....	1,300 oysters to the barrel
Half-Shells....	1,000 oysters to the barrel
Small Mediums	800 oysters to the barrel
Large Mediums	700 oysters to the barrel
Box	550 oysters to the barrel

In the sixth basket are placed seed oysters and small misshapen oysters, to be returned to the beds for further growth.

Holes in the concrete slab at each culling station connect through chutes to two belt conveyors running beneath the floor. One of these is a trash conveyor which carries the seaweed, algae and other waste material to the conveyor which serves the shell pile. The other conveyor carries large odd size or misshapen oysters to an inclined belt which raises these to the second floor and discharges them to the conveyor that serves the bin over the opening department.

Running completely around the culling department is a chain-trolley conveyor with attachments at regular intervals for holding the wire baskets of shell oysters. When one of these baskets is filled, it is put on this conveyor, which moves it through a washing station. Here, while the basket is gently shaken, the oysters are washed in a bath of chlorinated water and then rinsed in a cold water spray. After washing, the baskets are delivered to the barrel packing department, at the opposite end of the culling bin from the unloading dock. The barrels are tightly packed to prevent damage during shipment. After heading, the barrels move by hand truck to the loading dock at the front of the plant, where they are loaded directly on trucks for delivery.

Oyster Opening

Bin storage for oysters that are to be opened is the same as for shell stock. However, there are 38 opening stations on each side of this bin, or 76 in all. The workers open the oysters and remove the meats, which are placed in 1-gal. Monel metal pots. The capacity of the opening department is 2,000 gal. of oyster meats per day, requiring the opening of 400,000 oysters.

Shells from the opened oysters are dropped through a chute to a belt conveyor beneath, which delivers them to a pivoted inclined belt conveyor outside the plant, along with debris from the culling department. This inclined elevator stacks the shell in a semi-circular pile to a height of 30 ft. and this shell pile at full capacity will hold as much as 200,000 bu. However, this material has a definite use, being strewn over the sea bottom on the beds where seed oysters are to be caught, to give the seed something to which it can attach itself.

Packing Oyster Meats

When a pot is filled with opened oysters, it is delivered through a window into the packing room. Here everything that comes into contact with the oysters is of Monel metal, to avoid metallic contamination of the oysters and for ease of sanitation. After the pots are tallied, the oysters are emptied onto a tray and given a preliminary washing and inspection for the removal of discolored meats. Then they move down a series of metal riffle boards, with the wash

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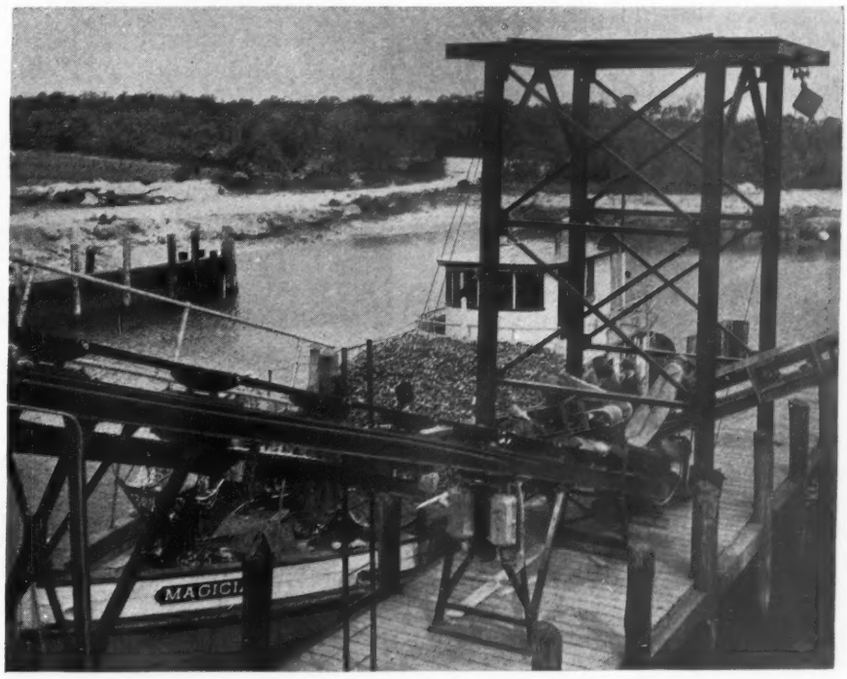
This article on
STRAIGHT-LINE PRODUCTION
Contains pointers for
All Food Manufacturers

It describes the application of straight-line production methods to an old established industry in a modern plant of fine appearance that makes full allowance for sanitation and good working conditions, but is economical in first cost and operation.—THE EDITORS.

Oyster dredge "Magician" has just docked at the Bluepoints Company's plant with a full deck load of oysters and the pivoted unloading belt has been lowered to the deck, ready to feed the oysters to the inclined belt which moves them to a bin on the second floor of the plant.



water, into tanks. Air agitation of the water in the tanks separates any sand and bits of shell from the meats. The oysters are then drawn from the tanks into skimmers where the water is drained off preliminary to grading and packing.

Grading Oysters

Grading is done by an automatic machine, which, by weight, separates the oysters at the rate of 100 per minute into the four commercial sizes:

Cocktail	250 oysters per gallon
Selects	210 oysters per gallon
Extra Selects	180 oysters per gallon
Counts	150 oysters per gallon

Construction Features

In addition to being designed to accommodate straight-line mechanized oyster packing, the plant embodies construction features designed to assure sanitation, low building and machine maintenance, flexibility and economy of operation, combined with pleasing appearance.

The main floor is 192 x 120 ft., while the second floor is 192 x 74 ft., giving a total floor space of about 35,000 sq. ft. Ceiling heights are 11 ft. The building has a steel frame with brick and cinder block walls finished outside with stucco. Inside walls are finished with glazed tile wainscote and plaster above, except in packing and freezing rooms, which are completely walled with white ceramic tile. The roof is flat, of felt, pitch and slag on reinforced gypsum plank.

In addition to the packing departments already described, the first floor contains modern locker and toilet rooms, a boiler room to supply heat and sterilizing steam and a steam sterilizer in which all the pots and containers for the opened oysters are sterilized. Refrigeration is supplied by a motor driven compressor unit. Refrigerated rooms are insulated with cork, covered by concrete on the floors and plaster on walls and ceiling.

On the second floor, in addition to the bins and conveyors already described, is a large storage space for barrels, containers and packaging stock. This floor also contains the offices of the company and a lunch room.

Taken as a whole, this new plant well illustrates a present trend in food plant construction. Actually, it can be considered as a shelter erected to cover the machinery and working space required to carry out a food manufacturing process. But this purely utilitarian function of the building has not been allowed to interfere with those considerations of sanitation, convenience, flexibility, employee comfort and morale, and pleasing appearance, which are so necessary to a successful manufacturing venture under the social and economic conditions that now exist.

At culling stations on the first floor of the Bluepoints plant, cullers inspect, clean and size-grade shell oysters for shipment in barrels. Note in the background, part of the chain-trolley conveyor that completely encircles the bin and carries the wire mesh baskets of shell oysters through a chlorinated bath and a rinsing spray before barreling.

Oysters from the grading machine fall into 5-gal. metal buckets according to size, from which they are hand-packed into lithographed compression lid cans.

After sealing, the cans are taken by lift truck to refrigerated storage, placed in boxes or barrels, covered with chipped ice and held for refrigerated shipment to markets all over the country.

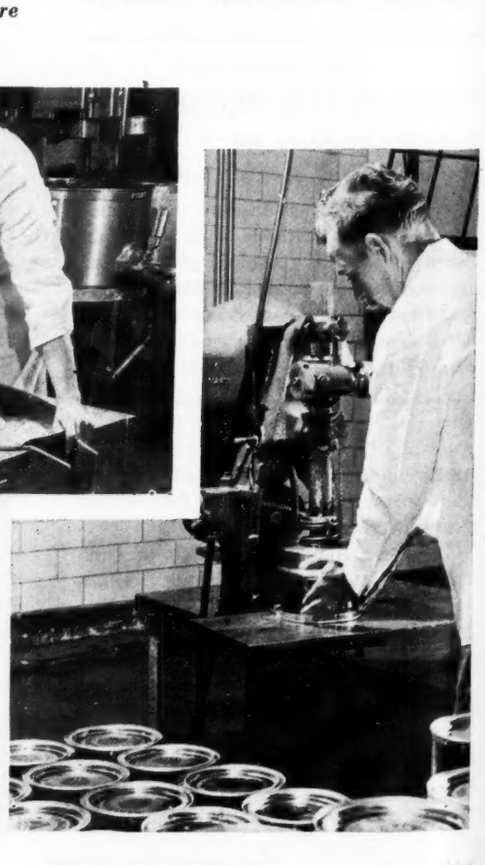
Freezing Oysters

For quick freezing, oysters are moved from the graders in the packing room by truck to an adjacent room equipped with a General Foods quick freezer.

Here the oysters are packed in paperboard boxes and placed between the freezing plates of the unit, which has a capacity of 300 gal. per day. After freezing, individual packages are packed in shipping cartons and held in low temperature refrigeration until shipped.

Shipping refrigeration is with solid carbon dioxide.

After being separated from sand and bits of shell by air agitation in washing tanks, oyster meats are run off into a "skimmer" for draining before being sized prior to canning or freezing.



In this closing machine, lithographed cans of oyster meats are sealed before refrigerated shipment to the markets of the nation.

Tests of Enzyme Converted Corn Sirup Reveal Desirable Properties

Frozen desserts improved by partial replacement of sucrose

By
P. H. TRACY
and
GEORGE EDMAN *
Department of Dairy Husbandry, University of Illinois, Urbana.

CORN SIRUP was used to some extent as a sweetening agent in ice cream during the period of the First World War when a shortage of sucrose existed. The early work of Ayers, Williams, and Johnson[1] as well as that of Frandsen, Rovner, and Luithly[4] indicated that corn sirup could be used to replace as much as 50 percent of the sucrose without impairing the flavor of the ice cream. However, with the passing of the war emergency period, sucrose supplies became plentiful and cheap, so there was less need for sugar substitutes. Neither the corn sugar nor the corn sirup of this early period was entirely satisfactory for use in ice cream. The sugar was brown in color and bitter in flavor. The corn sirup had a sweetening power of about 40 percent that of sucrose and contained a rather high percentage of dextrine.

Corn sugars manufactured today are of a snow white color and are pleasing in flavor. The use of dextrose in ice cream has been recently studied by Corbett and Tracy[2]. They recommend a 25 percent replacement of the sucrose with dextrose. The recent introduction of a new type of enzyme converted corn sirup, known commercially as "Sweetose", that has an increased dextrose equivalent and a reduced dextrine content as compared with the regular type of corn sirup, has made it desirable to study the use of this product as a sweetening agent in the manufacture of ice cream, sherbets, and ices.

TABLE I—Photometric Readings of Sucrose and E.C. Corn Sirup Mixes Pasteurized at 160 Deg. F.

Wave length	Photometer readings Mix 1*	Mix 2*	Mix 3*	Mix 4*
	Series I:			
480	56	60	59	57
510	62	66	67	64
540	64	68	70	65
570	62	65	66	63
600	59	61	62	58
630	54	57	56	54
	Series II:			
480	54	53.5	51	51
510	61	60	59	59
540	61	60.5	59	59
570	57.5	59	57	57
600	53	54	53	53
630	52	51	50	50

* Mix 1: 15 percent sucrose. Mix 2: 25 percent sucrose replaced with e.c. corn sirup. Mix 3: 32.5 percent sucrose replaced with e.c. corn sirup. Mix 4: 40 percent sucrose replaced with e.c. corn sirup. All replacements were on the basis of e.c. corn sirup sweetness being equal to 2/3 that of sucrose.

Plan of Study

All-sucrose ice creams were compared with ice creams containing a combination of sucrose and enzyme converted corn sirup (hereafter called e.c. corn sirup) from the standpoint of sweetness, color, viscosity, acidity, protein stability, freezing point, whipping ability, flavor, body and meltdown characteristics. The merits of e.c. corn sirup as a sweetening agent in sherbets and ices were likewise determined. A counter freezer, a 40-qt. batch freezer, and a 60-gal. per hour continuous freezer were used for freezing the experimental batches.

The experimental ice cream mixes were prepared from 40 percent cream, skim milk, condensed skim milk, 225 Bloom acid type gelatine, and the necessary sweetening agents. The mixes were pasteurized at 160 deg. F. for 30 minutes and were homogenized at either 2,500 or 3,200 lb. pressure.

The e.c. corn sirup used had the following composition, according to the Research Department of the A. E. Staley Manufacturing Company[3]:

	Percent
Moisture	18.00
Sugars	53.96
Dextrines	27.76
Ash	0.28

Carbohydrate composition on dry matter basis:

	Percent
Dextrose	42.5
Maltose	23.3
Dextrines	34.2

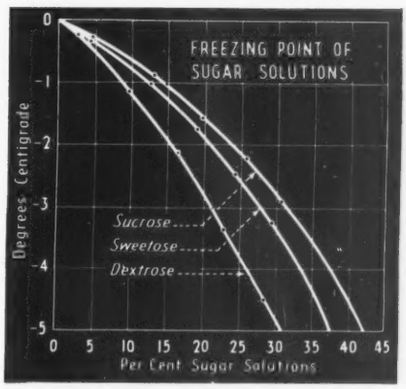


Fig. 1. Relative effects of sucrose, e.c. corn sirup, and dextrose upon the freezing point of water solutions.

Sweetening Value of E.C. Corn Sirup

As a preliminary to the study, organoleptic tests of ice cream containing e.c. corn sirup and sucrose were made using the value of 100 for sucrose as a basis of comparison. The e.c. corn sirup was found to have a sweetening value slightly less than two-thirds that of sucrose. Results of consumer tests, which will be given later, give further evidence that this sweetening value of e.c. corn sirup in ice cream is correct.

Color determinations were made with a Keuffel and Esser color analyzer, using wave lengths ranging from 480 to 630 millimicrons. This procedure compares the color of the mix with the color of magnesium carbonate, which is one of the whitest substances known. The whiter the mix, the closer the color reading approaches 100.

Viscosity measurements were made with a 50 milliliter pipette at the tem-

* Resigned June 1, 1940.

perature of mix storage or approximately 40 deg. F.

Effect of E.C. Corn Sirup Upon Color

The data in Table I do not show any definite effect of the e.c. corn sirup upon the color of the mix even when as much as 40 percent of the sucrose was replaced with e.c. corn sirup. It should be noted that the sirup used in this experiment was fresh and colorless in appearance. It has been observed that sirup samples held at room temperature in glass bottles over a period of several weeks acquired a yellow color. The use of such sirup would undoubtedly give the ice cream a slight yellowish cast.

Mix Viscosity

It is not to be expected that the use of e.c. corn sirup in the mix will affect the mix viscosity unless the dextrine content of the sirup is sufficient to be significant, or unless the sirup is capable of reacting with the mix constituents. Even when as much as 50 percent of the sweetener was added in the form of e.c. corn sirup, there usually was little change in mix viscosity when the gelatine content of e.c. corn sirup mixes was reduced to 6/7 that of the control mix. When the gelatine content of the mixes was the same, the viscosities of the mixes containing e.c. corn sirup were usually slightly greater than the viscosities of the control mixes.

Acidity

Though the pH of e.c. corn sirup (4.8–5.0) is somewhat less than that of the dairy products, its use did not materially change the pH of the mixes from that of the control mixes. The pH of all the experimental mixes was approximately 6.35.

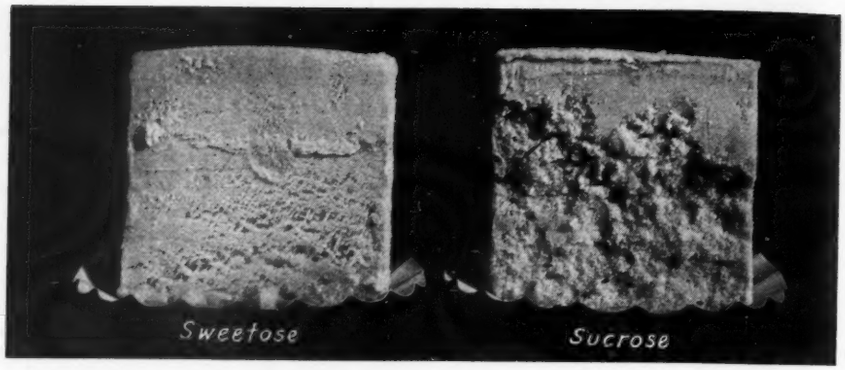


Fig. 2. Effect on body of water ices after two months storage. Sucrose sample contained 28 percent sucrose; other, 14 percent sucrose, 23 percent e.c. corn sirup.

TABLE II—Effect upon Mix Viscosity of Replacing Part of the Sucrose with E.C. Corn Sirup

Experiment	All Sucrose+	Percentage E. C. Corn Sirup Replacement 25%	32.5%	33.1/3%	40%	50%
1	*19.6 sec.	20.25 sec.	.....	19.6 sec.	.....	21.8 sec.
2	19.6 "	12.8 "	12.0 sec.	.....	12.1 sec.	.....
3	16.5 "	18.5 "	16.3 "	.....	14.3 "	.....
4	18.25 "	.....	.....	21.4 "	.....	.....

+ All sucrose batches contained 0.35 percent gelatine whereas the e.c. corn sirup batches contained 0.3 percent gelatine except Expt. 4, which contained 0.35 percent gelatine.
* Results stated in seconds required for mix to flow through pipette.

TABLE III—Effect of E.C. Corn Sirup Upon Curd Tension

Sugar content of mix	Curd tension when pasteurized 160 deg. F. for 30 minutes No. 1	No. 2
15% sucrose	12	12
25% sucrose replaced with with e. c. corn sirup	12	11
32.5% sucrose replaced with e. c. corn sirup	12	12
40% sucrose replaced with e. c. corn sirup	11	12

TABLE IV—Effect of E.C. Corn Sirup upon the Freezing Point of the Mix

Mix	Freezing point 0 Deg. C Test 1	Test 2
Control — 15% sucrose	−2.574	−2.582
25% e. c. corn sirup replacement	−2.834	−2.787
32.5% e. c. corn sirup replacement	−2.919	−2.922
40% e. c. corn sirup replacement	−3.014	−3.023

TABLE V—Effect of E.C. Corn Sirup Upon Mix Freezing

Experiment No.	Percent sucrose *A mixes	Percent sucrose *B mixes	Percent e.c. corn sirup	Time to whip to 100 percent overrun A mixes	B mixes	Minimum temperature deg. F. A mixes	B mixes	Drawing temperature deg. F. A mixes	B mixes
Batch Freezer									
1	15	10.0	7.5	8:30	9:30	23.0	22.3	23.45	22.95
2	15	10.0	7.5	7:30	9:00	23.0	22.25	23.50	23.0
3	15	10.0	7.5	7:30	8:00	23.3	22.8	23.5	23.15
4	15	10.0	7.5	5:00	6:00	23.8	23.2	23.8	23.3
5	15	11.25	5.67	6:50	5:50	23.3	22.9	23.6	23.1
5	.....	10.10	7.3	.....	6:00	.....	22.7	.....	22.9
5	.....	9.0	9.0	.....	7:50	.....	22.4	.....	22.8
6	15	11.25	5.67	5:35	7:00	23.5	22.5	23.5	22.75
6	.....	10.1	7.3	.....	8:00	.....	22.4	.....	22.65
6	.....	9.0	9.0	.....	7:00	.....	22.35	.....	22.5
Counter Freezer									
5	15	11.25	5.67	7:00	7:00	24.4	23.4	24.5	23.9
5	.....	10.10	7.3	.....	7:45	.....	23.4	.....	23.8
5	.....	9.0	9.0	.....	7:00	.....	23.7	.....	23.9
6	15	11.25	5.67	6:30	8:00	24.1	23.5	24.35	23.9
6	.....	10.1	7.3	.....	7:30	.....	23.2	.....	23.7
6	.....	9.0	9.0	.....	7:00	.....	23.3	.....	23.6
7	15	11.25	5.67	7:50	10:13	.....	.....	24.5	24.1
7	.....	10.0	7.5	.....	10:32	.....	.....	.....	23.6
7	.....	7.5	11.25	.....	10:40	.....	.....	.....	23.3
Continuous Freezer									
5	15	11.25	5.67	.....	.....	.....	.....	21.9	21.5
5	.....	10.10	7.3	.....	.....	.....	.....	.....	21.7
5	.....	9.0	9.0	.....	.....	.....	.....	.....	21.2
6	15	11.25	5.67	.....	.....	.....	.....	22.0	21.5
6	.....	10.1	7.3	.....	.....	.....	.....	.....	21.0
6	.....	9.0	9.0	.....	.....	.....	.....	.....	21.0

* A mixes—control mixes; B mixes—e.c. corn sirup mixes.

Curd Tension

For evidence of the possible action of e.c. corn sirup upon the proteins of the mix, the curd tension of mixes containing varying amounts of sucrose and e.c. corn sirup was determined. A modification of the Hill curd test was used to measure the firmness of the coagulum formed when the ice cream mix was mixed with a calcium chloride plus pepsin solution. Tension was measured in grams which represent the force required for a standard star-shaped knife to be pushed through the coagulated curd. E.c. corn sirup was found to exhibit no measurable effect on the curd tension.

Freezing Point Determinations

To compare the effect of the more commonly used sugars upon the freezing point, water solutions of sucrose and e.c. corn sirup were prepared for freezing point determinations. The results are plotted in Fig. 1. The

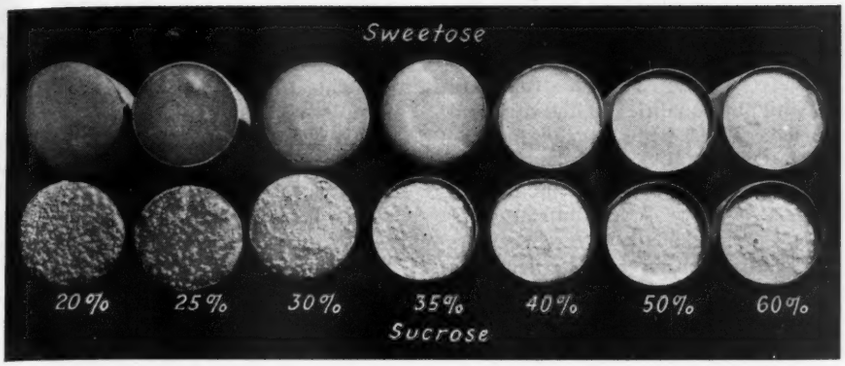


Fig. 3. Water ices containing varying amounts of sucrose and e.c. corn sirup after 22 days of storage (uncovered) in the hardening room.

dextrose values used were those determined by Roth [5].

The e.c. corn sirup solutions had a slightly lower freezing point than did the same percentage solution of sucrose solids, although the difference was less marked at lower concentrations. Dextrose solids depress the freezing point more than e.c. corn sirup.

Freezing points of several mixes containing e.c. corn sirup and sucrose were determined.

The mixes reported in Table IV contained approximately 12 percent fat and 11 percent serum solids. The use of e.c. corn sirup, as would be expected from its composition, will lower the freezing point of the mix to a slightly greater extent than will an equivalent amount of sucrose solids.

TABLE VI—Effect of E.C. Corn Sirup Upon Body of Ice Cream

Experiment No.	Composition of the mix: Percent sucrose	Percent e.c. corn sirup	Percent e.c. corn sirup replacement	Body score
	Batch Freezer			
1.....	15	.....	.....	23.5
.....	9	9	40	23.85
.....	10	7.5	33⅓	24.1
.....	10.1	7.3	32.5	23.7
.....	11.25	5.67	25	23.6
2.....	15	.....	.....	23.5
.....	9	9	40	24.00
.....	10.1	7.3	32.5	23.85
.....	11.25	5.67	25	23.75
	Counter Freezer			
1.....	15	.....	.. ....	22.75
.....	7.5	11.25	50	23.50
.....	10.0	7.50	33⅓	23.25
.....	11.25	5.67	25	23.00
2.....	15	.....	.....	22.75
.....	9	9	40	22.95
.....	10.1	7.3	32.5	22.85
.....	11.25	5.67	25	22.75
3.....	15	.....	.....	23.00
.....	9	9	40	23.5
.....	10.1	7.3	32.5	23.25
.....	11.25	5.67	25	23.25
	Continuous Freezer			
1.....	15	.....	.....	23.25
.....	7.5	11.25	50	23.75
.....	10.0	7.50	33⅓	23.6
.....	11.25	5.67	25	23.4
2.....	15	.....	.....	23.75
.....	9	9	40	23.90
.....	10.1	7.3	32.5	23.5
.....	11.25	5.67	25	23.85
3.....	15	.....	.....	24
.....	9	9	40	24.25
.....	10.1	7.3	32.5	24.10
.....	11.25	5.67	25	24

Fig. 4. Comparison of water ices containing e.c. corn sirup, dextrose and sucrose after 27 days in hardening room, uncovered, with 47 percent e.c. corn sirup in e.c. corn sirup sample, 28 percent dextrose in dextrose sample, and 28 percent sucrose in sucrose sample.

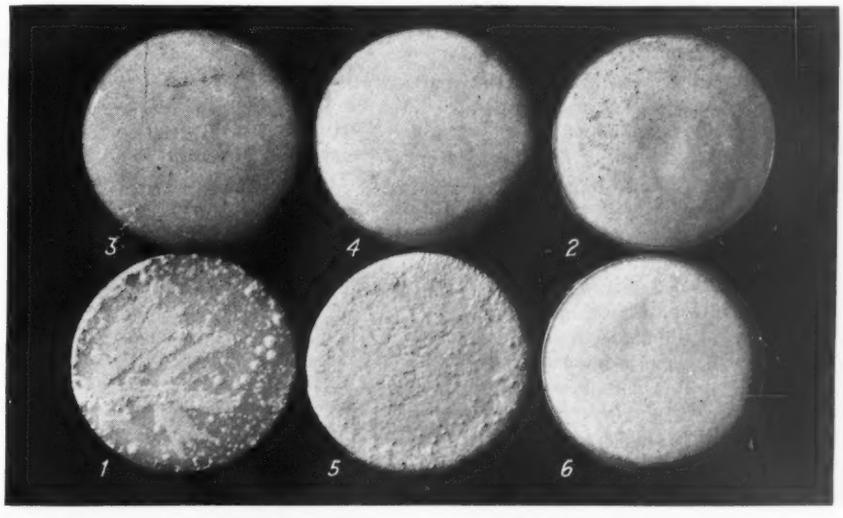


Fig. 5. Comparison of water ices containing different types of sugars after 27 days storage in hardening room, uncovered.

1. 28 percent sucrose.
2. 14 percent sucrose, 23.5 percent e.c. corn sirup
3. 21 percent sucrose, 11 percent e.c. corn sirup
4. 21 percent sucrose, 7 percent dextrose
5. 28 percent dextrose.
6. 47 percent e.c. corn sirup.

Effect Upon Mix Freezing

A summary of the freezing data on seven experiments is recorded in Table V. As would be expected from the data obtained on the effect of e.c. corn sirup upon the freezing point of the mix, the use of e.c. corn sirup in the mix results in a lower minimum temperature in the freezer and a lower drawing temperature. A replacement of 25 to 33⅓ percent of the sucrose with e.c. corn sirup will result in the drawing temperature being reduced 0.5 to 0.75 deg. F. if the same degree of stiffness is to be secured.

The presence of e.c. corn sirup slightly extends the time required to obtain 100 percent overrun.

Effects Upon Body, Flavor

The use of e.c. corn sirup in the mix usually results in a higher body score (Table VI) than when all sucrose is used. This is particularly true when the same amount of stabilizer is used. This effect is to be expected from the higher solids content of the

e.c. corn sirup ice creams and the slightly lower freezing point that the e.c. corn sirup ice cream has. For each 1 lb. of sucrose replaced there will be 1.5 lb. of e.c. corn sirup added. This amount of the sirup will contain approximately 1.25 lb. of solids which represents an increase in solids content of 25 percent. In other words, for each 150 lb. of e.c. corn sirup used to replace 100 lb. of sucrose, 25 lb. of additional solids will be added to the mix. It is likely that the dextrine content of e.c. corn sirup aids in improving the body of the ice cream.

E.c. corn sirup has no flavor other than sweetness, so that its use in the mix will not alter the flavor of the ice cream. It has been observed that some ice cream flavors are intensified by the e.c. corn sirup whereas others are less intense when e.c. corn sirup is used.

Consumer Tests

Though the reliability of consumer tests is to be questioned, they are useful in determining in a general way the acceptability of a product by critical buyers. To determine to what extent consumers might be able to distinguish between vanilla ice cream sweetened with sucrose and that sweetened in part with e.c. corn sirup, the following ice creams were prepared:

This ice cream was fed to a group of 290 individuals representing stenographers, clerks, faculty, a food class and a service club. The results in Table VII indicate that a slight majority of the judges thought that the ice cream containing e.c. corn sirup had a better body, and about the same proportion preferred the flavor of the control ice cream. Many of those indicating a preference for the flavor of the e.c. corn sirup ice cream stated they did so on the basis of sweetness, yet 65 percent of the judges could detect no difference in the sweetness. Several of those selecting the flavor of the e.c. corn sirup ice cream did so because they thought it was richer.

Melting Resistance

Little difference was noted in the rate of melt-down of ice creams containing sucrose and those containing a combination of sucrose and e.c. corn sirup. When samples of the different experimental ice creams were subjected to melt-down tests, the type of freezer used was found to be a more significant factor than the use of e.c. corn sirup.

Sherbets and Ices

In studying the use of e.c. corn sirup in the manufacture of sherbets and ices, an attempt was made to determine the maximum amount of the sirup that could be used satisfactorily. The effect of the e.c. corn sirup upon the whipping qualities of the mix and the flavor and body of the finished products were studied. The relation of the use of e.c. corn sirup to surface crustation was determined, using water solutions of the different sugars which were frozen and hardened in the same manner as sherbets and ices.

The maximum sucrose replacement found practical was 50 percent. When used in this proportion, the body of the sherbets and ices was noticeably smoother than that of the product containing all sucrose (Fig. 2). No difficulty was experienced in limiting the overrun when pectin was used as the stabilizer. It was also found possible to reduce the stabilizer content 20 percent when e.c. corn sirup was used.

An experiment was performed in which the relative value of sucrose and e.c. corn sirup in various flavored sherbets and ices was determined. It was noticed that, when 50 percent of the sucrose was replaced with e.c. corn sirup of equal sweetness, certain flavors such as cranberry, raspberry, and mint were intensified. Storage of the sherbets and ices for two months in the hardening room had little effect upon the flavor or body of those samples containing e.c. corn sirup, whereas the all-sucrose samples had a less pleasing flavor and showed considerable evidence of surface crustation and bleeding.

Since e.c. corn sirup is a non-crystallizable sirup, its use should aid in the prevention of surface crustation. The superiority of e.c. corn sirup to dextrose and sucrose in this respect is shown by Figs. 3 to 5.

The sherbet and ice formulas recommended for use are as follows:

Sherbet Formula		Ice Formula	
14.0	lb. sucrose	14.0	lb. sucrose
23.5	lb. e.c. corn sirup	23.5	lb. e.c. corn sirup
16.0	lb. 12% mix	.4	lb. dry citric acid
.4	lb. dry citric acid	.25	lb. pectin
.25	lb. pectin	61.85	lb. water and flavor
45.85	lb. water and flavor	100.00	lb.
100.00	lb.		

TABLE VII—Results of 290 Consumer Tests

Sweetening agent	No. preferring quality indicated: Body	Flavor	No. choosing ice cream as sweeter	No. finding no difference in quality indicated: Body	Flavor	Sweetness
Sucrose..	110	143	55	37	55	188
E. c. corn sirup...	140	116	15			

Summary of Criticism

Criticisms	e.c. corn sirup	Sucrose
1. Richer or creamy	29	19
2. Not so rich	2	3
3. Smoother body	86	48
4. Better texture and body	14	9
5. Firmer body	19	18
6. Better flavor	18	17
7. More vanilla flavor	0	7
8. Colder	6	3

TABLE VIII—Comparison of Melting Resistance of All Sucrose and Part E.C. Corn Sirup Ice Creams Frozen on Different Type Freezers (Tests Conducted at 74 deg. F.)

	Weight of pan	+ Cream pan	Weight of ice cream	Percent melt 1 hr.	Percent melt 1½ hr.	Percent melt 2 hrs.
No. 1C...	62	1.19	.57	8.5	35.1	57.9
1C...	68	1.26	.58	10.3	36.2	58.6
2C...	59	1.17	.58	6.9	25.8	43.1
2C...	68.5	1.25	.565	6.2	24.7	41.5
3C...	58.5	1.14	.555	8.1	35.4	60.3
3C...	69	1.245	.555	7.2	36.3	61.1
4C...	61.5	1.18	.565	5.1	34.8	58.5
4C...	69.0	1.16	.47	8.5	42.5	70.1
No. 1B...	56	1.11	.55	13.6	36.3	60.0
1B...	68	1.22	.54	11.1	37.0	59.25
2B...	59	1.15	.56	8.9	35.7	57.1
2B...	69	1.26	.57	8.7	36.8	57.9
3B...	56	1.12	.56	14.5	58.0	60.8
3B...	70	1.25	.55	10.8	36.3	57.8
4B...	61	1.17	.56	12.6	40.2	60.8
4B...	70	1.26	.56	10.7	39.3	57.1
No. 1M..	62	1.15	.53	22.6	49.5	69.9
1M..	87	1.41	.54	20.3	47.4	58.5
2M..	64	1.175	.535	16.5	46.7	69.1
2M..	59	1.13	.54	12.9	47.4	58.5
3M..	62	1.16	.54	14.8	44.6	56.8
3M..	59	1.13	.54	16.6	44.6	65.9
4M..	60	1.14	.54	18.5	47.4	67.7
4M..	57	1.09	.52	13.2	46.1	67.4

No. 1 sucrose
No. 2 40% e.c. corn sirup replacement
No. 3 25% e.c. corn sirup replacement
No. 4 32.5% e.c. corn sirup replacement

C = continuous freezer
B = batch freezer
M = counter freezer

Summary and Conclusions

Enzyme converted corn sirup, a new type of sweeting agent containing dextrose, maltose and pro-sugars or dextrine, has been studied. As used in frozen dairy products, e.c. corn sirup has a sweetening value of approximately two-thirds that of sucrose. A maximum sucrose replacement of one-third for ice cream and one-half for sherbets and ices is recommended.

E.c. corn sirup depresses the freezing point to a greater extent than does an equivalent amount of sucrose solids, but to a lesser degree than does dextrose, because of the lower molecular weight of the latter.

There are no undesirable effects of e.c. corn sirup upon mix color, viscosity, or melting resistance of the ice cream.

E.c. corn sirup retards whipping slightly, has no effect upon flavor, and improves the body of the ice cream.

The use of e.c. corn sirup aids in the prevention of surface crustation of water ices and sherbets and improves the body of these products.

Formulas for water ices and sherbets are included.

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What To Know About Filters

Principles upon which to base the selection of the right filter for a particular operation

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WHETHER the objective of filtration is clarification of a liquid, or the separation of substances in solution from insolubles, the procedure followed is of physical or mechanical character.

It is one part of the unit operation, separation, in food engineering which plays an important part in quality control technic as well as in the simplification of production practices. Filtration is limited to the treatment of solids-containing liquids that are sufficiently fluid so that they can be separated into a liquid portion known as the filtrate and a solids portion known as sediment, precipitate or filter cake.

Through its application, undesired impurities present in low concentrations may be removed from liquids as a step in clarification or purification. Also, the usable portion of a fluid mixture, containing solids in relatively high concentration, may be separated from the non-usable portion to the end that the non-usable portion may be discarded. In another sense filtration may be used for the purpose of reducing the liquid content of a fluid mixture as a means of concentrating the mixture to a weight or volume conducive to easier handling or better processing at other stations in the production line.

Filtration Problems

Regardless of the purpose for which filtration is employed, the chief problem, in actual practice, is to keep the liquid portion of the mixture flowing continuously through a separator or a filtering medium. The filter in its entirety is constructed so as to retain the sediment or precipitate on one side of the filtering medium while the filtrate is permitted to pass through.

Any filter fine enough to retain the suspended solids will, of course, impede the flow of liquid through the filtering medium. To overcome this back-pressure force must be used.

Sometimes gravity is the force utilized for this purpose. The head or gravity force of the fluid mixture provides the pressure to drive the liquid portion through the filtering medium. Or mechanical pressure may be applied bv means of pumps or centrifuges. All that is necessary to force the liquid through the filtering medium is that the forward pressure of the mixture being filtered be greater than the back pressure of the filtrate. Another way of accomplishing this result is to reduce the back pressure of the filtrate by the use of a vacuum.

For efficient operation, the pressure between the intake of the filter and its outlet must be adjusted to overcome the resistance exerted by the filter and by the sediment which accumulates upon the filtering medium. If the forward pressure is too great, there is a tendency for particles of the sediment or precipitate to be forced into the pores of the filtering medium in such a way as to seal or block up these pores and destroy the utility of the filter. The preferred pressure for various simple cases can be calculated by mathematical methods.[1]

The fundamental mathematical formulas are:

$$\frac{dV}{dN} = \frac{P}{R} \quad \text{and} \quad R = \frac{rL}{A}$$

V represents the volume of filtrate, in cubic feet, collected in the time N (hours), calculated from the beginning of filtration;

P is pressure drop through the filter cake in pounds per sq. in.;

r, specific resistance of the filter cake material;

A, area of the filter in square feet;

L, thickness of cake, in feet, built up in time N (hours);

R, total resistance.

In practice, however, so many variable factors are introduced that mathematical calculation is too difficult for practical purposes. The right pressure is usually determined by trial and error, aided by the results of past experience.

Since the mixtures consist of liquids containing undissolved suspended matter, the ease with which filtration may be accomplished depends upon the viscosity of the liquid and the size and nature of the particles suspended therein. Coarse-grained sediments are easier to remove than fine-grained ones. And, crystalline sediments are easier to remove than fine grained ones. Also, crystalline sediments are easier to remove than sediments in a colloidal state. Filtration is also easier when the specific gravity of the sediment is widely different from that of the filtrate.

Left undisturbed, most fluid mixtures have a tendency to separate in strata or layers. The heavy sediments settle to the bottom in the order of their specific gravities, whereas solids lighter than the liquid portion rise to the top. Only when the specific gravity of the filtrate and of the sediment is the same, or when the

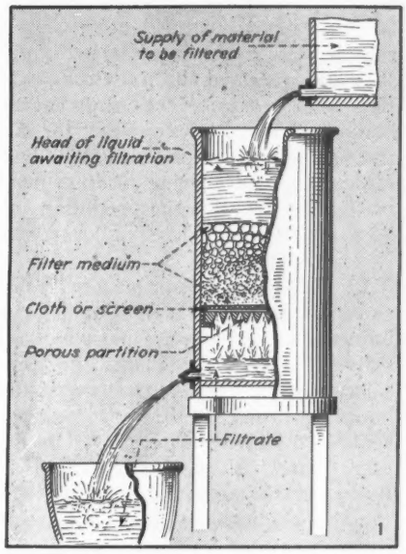


Fig. 1—Simple open filter.

This article on
FILTRATION
Contains information for
All Food Manufacturers

Because the solution of filtering problems demands an understanding of the fundamentals of filtration. With such knowledge, one can determine what engineering principles apply to the filtering problem at hand and then make use of the filter best suited to the job. The chart in this article will be particularly helpful in selecting the right filter.—THE EDITORS.

[1] Ruth, B. F., Montillon, G. H., and Montanna, R. E. Studies in Critical Analysis of Filtration Theory. *Industrial & Engineering Chemistry*, **25**, 76 (1933).

sediment has been thoroughly emulsified with the liquid, will there be no separation during standing. This natural tendency to separate under the influence of gravity action should be taken advantage of in filtering operations. To illustrate: If the precipitate has a greater specific gravity than the liquid, the batch should be allowed to stand undisturbed until the precipitate has settled to the bottom of the container, then the supernatant liquid should be decanted and passed through the filter. Since the supernatant liquid will be relatively clear, the filtration will proceed smoothly and rapidly and the filtering medium need not be clogged with the precipitate, at least not until the filtering operation is nearly completed.

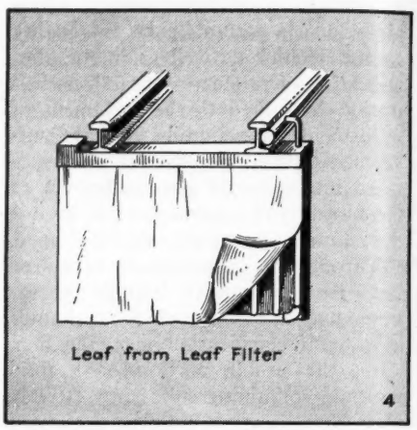
In order to separate the solid materials properly from liquids, the influence of temperature must be considered. Many sediments go into solution when the temperature of the liquid is raised. Filtration does not remove dissolved materials. On the other hand, it is often possible to throw certain constituents out of solution by chilling the fluid. The cold liquid may then be filtered to remove the solids. Viscosity, which is the resistance of a liquid to flow, usually decreases as the temperature is increased. For example, dilute water solutions will filter several times as fast near the boiling temperature as they will at room temperature. For this reason, the filtration of fluids of high viscosity should always be carried out at temperatures as high as the nature of the material being filtered will permit.

Temperature change has the advantage over chemical methods of separation in that adulteration or dilution of the liquid is less likely to result. Accordingly, temperature change is the choice in the food industry in all cases where it is applicable. However, there will be times when extraneous materials or filter aids must be added to facilitate filtration. Sometimes these filter aids may be substances like albumin, which will surround particles of impurity and increase their size, or inert materials like diatomaceous earth or paper may be added to give porosity to the precipitate. These aids help to prevent clogging of the filtering medium and permit the filtering to be done at a relatively rapid rate. The filter separates such mechanical filter aids from the filtrate at the same time the precipitate or sediment solids are separated.

In other cases, a mechanical or structural change in the precipitate may be necessary before filtration can be accomplished successfully. Such changes may be accomplished by saponification, by change in the alkalinity or acidity of the fluid, by neutralization of the electrical charge on colloid particles, or by coagulation of proteins, pectins and resins, either by heat or chemical means. Electrical neutralization is what occurs when gelatin is added to tannins or vice versa.

Numerous impurities may be removed from liquids by means of surface-attracting properties of filter aids. As an example, gases, coloring matter and the like may be removed by the surface attraction of activated charcoal, which in turn is removed by filtration. Terpenes and certain ethereal oils are adsorbed by magnesia and then removed by filtration. In practice, the filter aid used as an absorptive is frequently the real filtering medium.

In this connection, it should be noted that filter aids which affect the composition of wines and distilled gin, by removing some of the acidity or part of the ethereal oils, may not be used without a rectifier's license. The product obtained from treatment of this kind is subject to an additional Federal tax of 30 cents per proof gallon.



Leaf from Leaf Filter

4

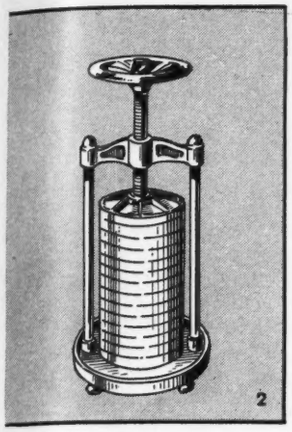
Characteristics of Different Filters

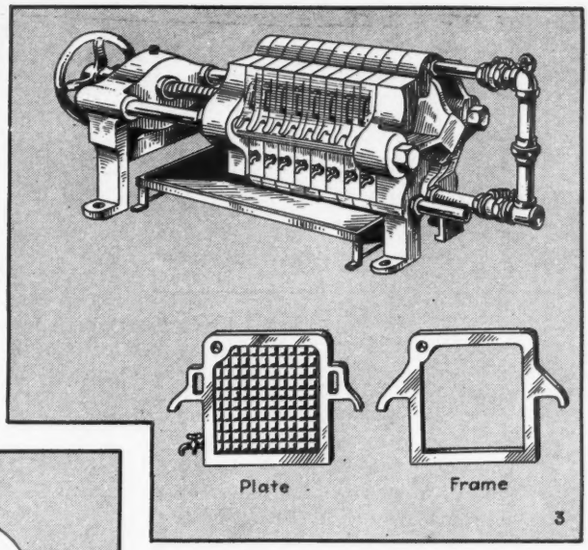
Filter media used, pressure source, flow of filtrate, cleaning method and economics.

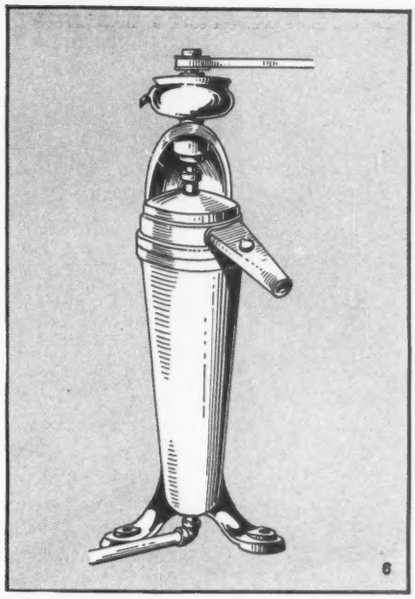
	Chamber filters (Fig. 2)	Plate and frame filters Membrane filters (Figs. 3 and 7)	Leaf filters (Fig. 4)	Rotary continuous filters (Fig. 5)	Centrifuges (Fig. 6)
Filter media.....	Crushed, shredded or powdered inert material such as asbestos, cellulose, paper pulp, infusorial earth (loose or cake or plate shaped), tightly stuffed into the filter chamber	Solid or porous plates or screens in frames, with or without coatings of inert loose media or of ready-made media sheets or membranes	Screen leaves, covered with fibrous, porous bags		A perforated drum
Pressure differential is supplied by	Filter pump (pressure pump)	Filter pump (pressure pump)	Filter pump (pressure pump)	Vacuum pump	Rotation (centrifugal force)
Filtrate flows off the medium	Through screen-covered exit of chamber	Through inner space of frame, or between the coating and the channeled sides of the plates. Frames or plates have channels for filtrate collection	Along the screens underneath fiber bags	Through central collection pipe	Along the inner wall of the casting which encloses the rotating drum
Cleaning of the filter and removal of sediment (filter-cake) is accomplished by	Backwash; or replacement by new or washed medium	Discarding coatings, washing in both directions between inlet and exit	Backwash	Automatic washing, drying and scraping	Scraping and expulsion
Economics (cost considerations)	Low purchase price, requires small floor space, expensive in operation		Low labor costs, suitable only for large quantities. Restricted efficiency		Low purchase price and operating costs. Restricted efficiency

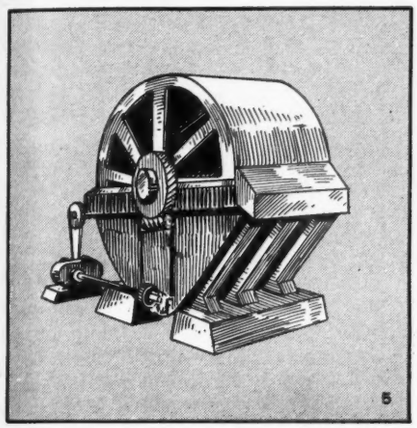
Filtering Equipment

Filters may consist of perforated plates with or without channels, or of screens formed into any convenient shape. Or the filter may consist of a pile of crushed, shredded, or powdered material, such as diatomaceous earth, asbestos, cellulose, sand, carbon or synthetic chemicals through which the fluid is allowed to percolate. The chemical composition of the filtering medium or filter aid may result in chemical changes in the composition









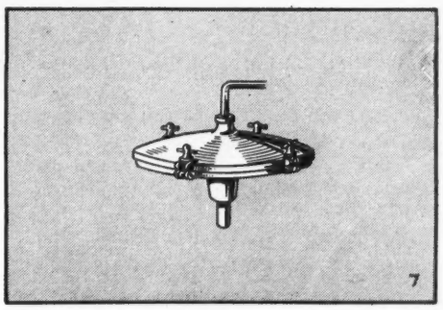


Fig. 2—Chamber type of closed filter.

Fig. 3—Plate or frame type of closed filter.

Fig. 4—Leaf type of closed filter.

Fig. 5—Rotary continuous closed filter.

Fig. 6—Centrifuge type of closed filter.

Fig. 7—Membrane filters for sterilization of fruit juices and beverages.

of the filtrate because of chemical reaction of the filtering medium with something in the fluid or because of removal of something in the fluid by surface attraction upon the particles of the filtering medium.

While the removal of impurities from gases and vapors is of importance in the chemical process industries, their removal (except in the case of air and process steam) does not often arise directly in the preparation of foodstuffs.

Probably the filtering equipment in most common use is the ordinary open filter consisting of a barrel divided by one or more porous partitions, or filled with layers of loose filtering medium (Fig. 1). The filtering medium is often used in conjunction with porous partitions and is arranged in such a way that the fine particles rest on the partition and the coarser particles are piled upon the finer. Open filters use gravity as the driving force, and the rate of filtration depends on the head of liquid awaiting filtration. Ordinarily, an open filter has a limited capacity, averaging about 2 to 4 gal. per minute per square foot of filtering surface of the unit.

Open filters are satisfactory for filtering liquids which have a considerable natural tendency to separate into layers. But, they have limited value in handling colloidal animal derivatives, such as milk, glue and fish oils. Of course, open filters are not suitable for use with volatile liquids nor with substances which are chemically affected by prolonged exposure to the air. When the open filter is applicable it is economical and, with a proper choice of packing, it is frequently quite efficient. Huge water filtering plants work on the principle of the common open filter. The capacity can be increased to tremendous volumes, as is shown by the Chicago South District Filtration Plant now under construction. This installation will be the largest filtering plant in the world. Its capacity is estimated at 450,000,000 gal. of filtered water per day. Its average rating is 2½ gal. per square foot of filter surface per minute in winter and 3 gal. per square foot per minute in summer.

There are also numerous types of closed filters, such as chamber filters (Fig. 2), plate or frame filters (Fig. 3), leaf filters (Fig. 4), rotary continuous filters (Fig. 5), and centrifuges (Fig. 6). Closed filters permit the use of pressure or vacuum to increase the rate of filtration and to force fluids through filters with pores so fine as to retain the fluid under ordinary conditions of pressure.

Zsigmondy and Bachmann have prepared membranous colloidal fil-

(*Turn to page 107*)

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Better DUST CONTROL Needed*

Yeasts, molds and bacteria in air contaminate product in plant, causing spoilage. Studies in beverage industry reveal problem and the solutions

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ALL food industries are confronted with the problem of spoilage due to the depredations of microorganisms, including bacteria, yeasts and molds, together with the smaller animal forms. The food industries are, therefore, engaged in a struggle to control these undesirable microbes so as to prevent deterioration.

The practice, particularly in small plants during the summer season, of operating with all windows open, though generally well screened against flies, exposes the manufacturing processes to dust contamination from the outside air. It was, therefore, thought that some observations on the incidence of organism in general, and yeasts in particular, in the air of beverage plants might yield some light on the degree of protection needed against this possible source of yeasts and molds, and on the precautions required to eliminate such hazards, to the extent that dust might serve as the ultimate source of spoilage organisms.

Two types of observations were made with a view of obtaining some idea as to the content of microorganisms, particularly yeasts, in the outdoor air in the vicinity of beverage plants in Iowa and Minnesota and in the air at different points within the plants. One of the methods consisted of drawing a sample of air, generally 10 cu.ft., through an apparatus which would cause the dust particles to be thrown on a solid substance, containing food material, which would retain the dust particles falling thereon and upon which the yeasts or other microorganisms present might grow. The other approach consisted of exposing dishes containing similar food materials to the air of the beverage plants and permitting the dust to settle down upon the surface of these media for a period of, generally, 15 minutes. From these observations it was possible to compute the numbers of bacteria, yeasts and molds per 10 cu.ft. of air, and the number of these organisms falling per square foot of an exposed surface per hour.

From the results for a limited number of observations, which are summarized in Table I, the following may be noted:

In the outdoor air in the vicinity of beverage plants the numbers of bacteria varied from a minimum of 26 to a maximum of 420 per 10 cu.ft. whereas samples taken in the beverage plant near the soaker showed 184 to 1,700 bacteria per 10 cu.ft. With respect to molds, the minimum number observed in the outside air was 24 with a maximum of 130, as compared with a minimum of 41 and a maximum of 1,500 per 10 cu.ft. inside the plant. The yeasts which are of particular significance, showed a minimum of 2 organisms and a maximum of 66 per 10 cu.ft. of outside air compared with a minimum of 10 and a maximum of 500 per 10 cu.ft. in the same volume of air within the plant.

Amount of Contamination

Considering the number of organisms falling in a given time, it was found that in the outside air the minimum number of bacteria observed to fall per square foot per hour was 4,600 and the maximum 13,000, whereas within the plant the minimum was 2,900 and the maximum 68,000. For molds, the minimum observed in the outside air was 890 and the maximum was 2,240, while within the plant the minimum was 415 and the

This article on
QUALITY CONTROL
Is of interest to
All Food Manufacturers

Because it shows the part dust in food plants plays in the deterioration of the finished product. And the author not only puts the finger on an invisible source of contamination but he tells what to do to eliminate the trouble. —THE EDITORS.

* Condensed from a paper, "Importance of Dust Control in Beverage Plants," presented by Max Levine at a special technical meeting held in conjunction with the convention of American Bottlers of Carbonated Beverages, in Cincinnati, November 11, 1940.

TABLE I—Incidence of Microorganisms in Air of Beverage Plants in Vicinity of Such Plants.[2]

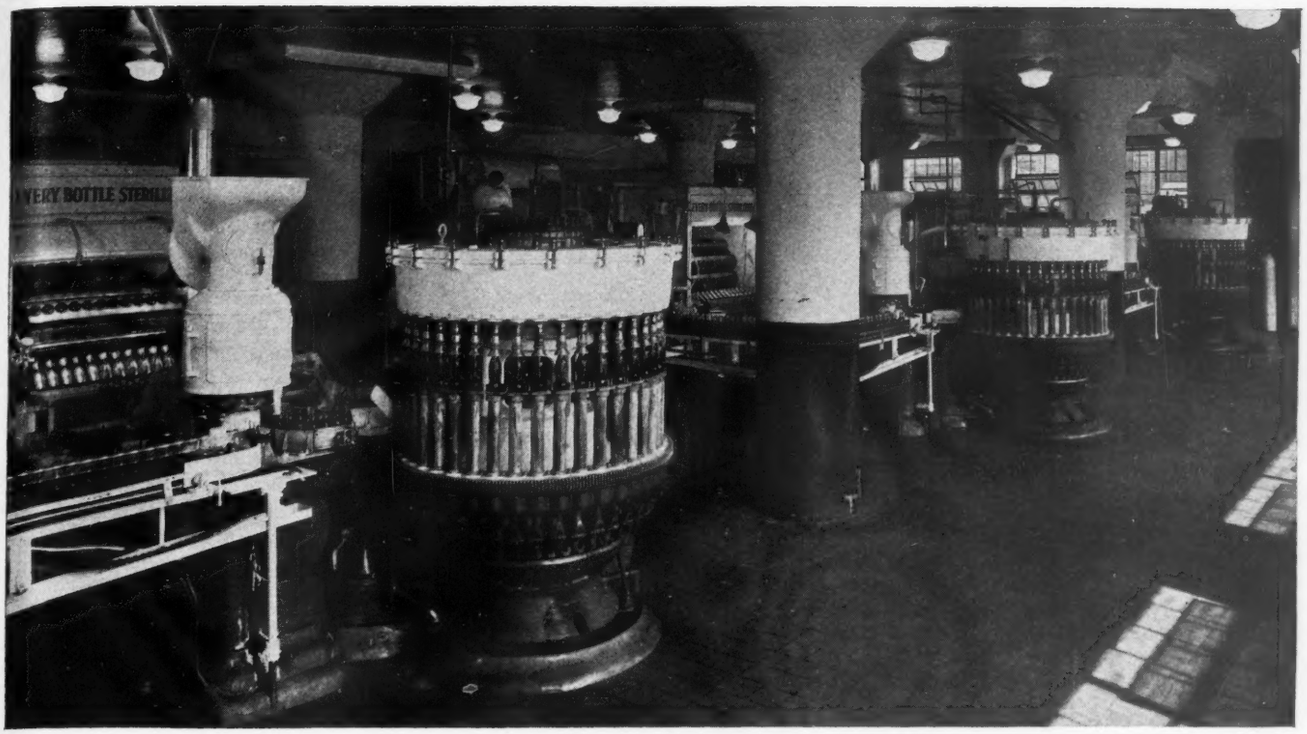
	Bacteria	Molds	Yeasts	Bacteria	Molds	Yeasts
Outdoor air in vicinity of beverage plants	No. per 10 cu. ft.			No. falling per sq. ft. per hr.		
Maximum	410	130	66	13,000	2,240	2,660
Minimum	26	24	2	4,600	890	235
Average	224	63	24	7,580	1,610	1,240
Air in beverage plant near receiving end of bottle washer						
Maximum	1,700	1,500	500	68,000	4,400	24,000
Minimum	184	41	10	2,900	415	175
Average	572	259	87	24,620	1,470	5,510

[2] Compiled from research data obtained by Raymond Hertz, Research Fellow, A.B.C.B. Fellowship, Iowa State College, Ames, Iowa.

TABLE II—Incidence of Yeasts at Various Points in Beverage Plants.[1]

Plant number	Washer feed	Washer discharge feed	Sirup room	Washer feed	Washer discharge feed	Sirup room
	Yeasts per 10 cu.ft.			Yeasts per hr. per sq.ft.		
Sirup room open suspended gallery near filler						
I	103	37	33	10,000	825	940
II	500	58	38	24,000	1,770	2,240
Sirup room separated from bottling room						
III	24	33	8	5,000	235	295
IV[3]	.....	153	76	.....	2,600	600
V	92	39	1	13,000	890	[3]
VI[3]	.....	25	0	.....	470	0

[1] Compiled from research data obtained by Raymond Hertz, Research Fellow, A.B.C.B. Fellowship, Iowa State College, Ames, Iowa.
[2] Single end washer count at feed and discharge, therefore the same.
[3] Only one colony on exposed plate, count too low for reliable determination.



Plant layout and construction have a lot to do with the amount of product contamination which occurs in the food factory. In this beverage plant, a wall separates the receiving end of the bottle washers from the discharge end, thereby greatly reducing the contamination at the discharge end. This is one of many practices recommended by the author.

maximum 4,400. With respect to yeasts, the number falling per square foot per hour was as low as 235, with a maximum of 2,650 in the outside air, and in the beverage plant the lowest result observed was 175 and the maximum 24,000. The actual numbers of organisms falling in a given time on a stipulated area depends not only on the numbers of microorganisms present in the air but upon the size of dust particles to which they are attached, moisture content of the air and air currents.

Where to Look for Trouble

It is apparent from Table I that the incidence of microorganisms is greater near the receiving end of the soaker within the beverage plant than in the outdoors. This is not unexpected. In many instances the receiving and delivery end (as in the single-end machines) are together and sirup rooms of the gallery type might be directly over, or very close to, the point of air sampling. So the results are illustrative of the relative incidence of organisms in, and possibility of contamination from, beverage plant air as compared with street air. The question which it is desired to put to the beverage manufacturer is, therefore, this: Should not precautions be taken to see to it that the particularly vulnerable spots from the standpoint of contamination (such as sirup rooms, brushes on the soaker and stored sugar) are protected against contamination by dust from the vicinity of the receiving end of the bottle washing machine?

It must be borne in mind that these data are based on a relatively few plants, only ten, and it is again desired to emphasize the necessity for many more observations. They illustrate, however, quite clearly the greater incidence of yeasts within the plant than in the outdoor air. This is true both with respect to the number of yeasts per unit or volume of air and the number that fall in a given time. The importance of protecting sugar, brushes, sirup rooms, and particularly sugar sirup against these organisms found in the proximity of the receiving end of the soaker must be apparent.

Need for Good Housekeeping

Sugar should not only be stored in a dry room but it is preferable to have the piles of sugar bags covered as an additional protection against excessive dust contamination. But, particularly, the elimination of the cloth sacks in favor of paper bags and stripping the outer paper or cloth bag before taking the sugar into the sirup room would be an additional factor of safety against bringing in dust that had accumulated on the surface of such containers.

That hair bristle brushes, if not properly cared for, may be contaminated with yeasts and molds and that they bear an adequate supply of food material for the growth of such organisms may be demonstrated by removing a hair bristle and permitting it to sit in a moist atmosphere; mold-like and yeast-like growths will be seen to develop. This should not be construed as an argument against brushes but rather as an argument for their proper care, adequate sterilization and for elimination, as far as possible, of the probability of dust from the receiving end of the soaker reaching the brushes ahead of the rinsing process.

Considering the problem of sirup contamination, employing a small open sirup tank of 30- to 50-gal. capacity with a diameter of about 2 ft., the area of the exposed surface would be approximately 4 sq.ft. On the basis of the data presented, an average of approximately 2,200 yeasts would find their way into the sirup per hour. And this number, on the basis of the observations reported, might be as high as 100,000, which would amount to 15 to 25 organisms per ounce, if evenly distributed throughout the sirup. Furthermore, it should be borne in mind that the figures reported do not represent numbers of individual yeasts but rather the numbers of clumps of yeasts, so that the actual incidence of individual yeast plants would be considerably higher. Such an inoculum might readily serve as a nucleus for extensive yeast growth, particularly if sirups of the lighter densities are stored before

use, and, even more so, if the sirup lines are inadequately washed and some of these organisms find their way thereto. The necessity for protection of these vulnerable areas in the beverage plant against such contamination must be evident.

How Plant Layout Influences Contamination

What are the possibilities and probabilities of organisms in the dust near the receiving end of the soaker finding their way to the sirup room and what precautions might be taken to reduce or preferably eliminate this hazard? The findings in several different types of plants—that is, types from the standpoint of plant layout—may well serve to illustrate the problem and possible remedies. Three types of plant layout will be considered: namely, those in which the sirup room consists of a suspended gallery; secondly, those in which the sirup room constitutes a separate unit, that is, separated from the filling and bottle cleaning room; and third, those in which the sirup room is not only separated from other plant operations, but is air conditioned.

In Table II are given illustrative data obtained from two plants of each of the types previously mentioned. The data presented are for the yeast counts only, that is, the number of organisms developing on a special medium (malt extract agar) which is particularly favorable for the growth of yeasts.

In general it will be noted that when straight-through soakers are employed, the number of yeasts per 10 cu.ft. of air in the vicinity of the discharge from the soaker is distinctly lower, generally about one-third to one-tenth of that at the receiving end of the soaker. The count would be further reduced if a partition wall were set up to separate the receiving from the delivery end of the soaker.

It will be noted that the number of yeasts per 10 cu.ft. of air in the sirup room, when the latter consisted of a suspended gallery over the filler, was not greatly different from that at the filler, whereas in the separate sirup rooms the count is lower and in air-conditioned rooms it is practically nil.

Turning to the number of yeasts falling per square foot per hour, it will again be noted that the numbers are much less at the delivery end than at the receiving end of the soaker, counts of 10,000 to 24,000 dropping down to 235 to 1,770 at the delivery end. This again illustrates the importance of physical separation of the receiving from the delivery end of bottle-washing machines.

Considering the relative number of yeasts falling in the sirup room and the vicinity of the filler, it will be noted that in the suspended open gallery type of sirup room, which consists merely of a raised platform above the filler (usually with side walls extending about 3 ft. above the sirup room floor and continued to the ceiling with window screening), the counts are as high or higher in this makeshift sirup room than in the vicinity of the soaker discharge and filler. In separate sirup rooms the results would depend on effectiveness of isolation, whether the windows were open immediately before and during sampling, and on the general housekeeping practice. In the two instances cited the number of yeasts falling per hour per square foot was somewhat more than that observed at the filler in one of the plants and less than one-fourth as great as that at the filler at the other plant.

In contrast with the foregoing results it will be noted that in the air-conditioned sirup rooms, the number of yeasts falling was so low that their incidence could not be determined.

Plant Design Affects Shelf Life

The data presented show quite clearly that the dust in the vicinity of the receiving end of the bottle washer is sufficiently highly contaminated to warrant particular precautions to prevent the yeasts and other microorganisms therein from finding their way into the sirup preparation room. Consequently, the hazards associated with the use of the all too commonly employed suspended, open-gallery type of sirup room are evident. In the beverage plant of the future such sirup rooms should not be employed, as beverages which will have long shelf life cannot be dependably produced under conditions encountered in these types of installation.

The desirability of walling off the feed end of the soaker is self evident.

The author, Max Levine.

Even when the sirup room is located on a different floor, so that the problem of direct contamination of the sirup room is eliminated, walling off to separate the receiving from the delivery end of the soaker would still be warranted for the purpose of protecting bottle washing machine brushes against contamination.

In spite of the fact that brushes are being constantly exposed to rinse water, which one might think would continuously remove any contaminating organisms, the facts seem to be that organisms finding their way to brushes, particularly of the hair bristle type, attach themselves thereto. And if conditions as to temperature and quiescent periods, as for example during shutdowns, are favorable, there is sufficient accumulation of food materials to enable the microorganisms to grow. Contaminated brushes are therefore an important possible source of bottle recontamination. Brushes should be sterilized frequently and always immediately before use, if there is a shut-down for any appreciable time, even as short a period as 8 to 12 hours. Any precautions which could be used to prevent the contamination of brushes by dust from the receiving end of the soaker would be an additional factor of safety against the hazards of bottle contamination.

Air Filtering or Air Conditioning Needed

The isolation of the sirup room from the bottling and washing room is indispensable, but is in itself not an absolute safeguard against dust contamination of sirup. The practice of opening windows and doors to the outdoors, protected merely by screens, affords an opportunity for dust contamination to enter to the extent that dust from the bottle receiving room as well as that from the normal outdoor air may find its way through such openings. Although isolation of the sirup room from other parts of the plant is quite satisfactory, complete protection against dust contamination would require that isolation should be supplemented with air-conditioning.

Many plants are now considering air-conditioning rooms in which processes that are particularly vulnerable to yeast contamination are carried out, and a number of such installations now exist. The beverage plant of the future should provide filtered air or air-conditioning for sirup rooms. In addition to this, air filtration or air-conditioning for the room containing the forward end of the bottle washing machine, including brushes and bottle discharge, and the filling and crowning machines, is indicated for complete safety against the dust hazard.

Public Relations Cake Cut Five Ways

Walter Baker birthday celebration is occasion for building good will by family day, gift plate, gift package, press parties and directors' meeting

Clarence Francis, president of General Foods, attended by two girls costumed to symbolize the company's trademark, cuts the 175th birthday anniversary cake of Walter Baker Co.

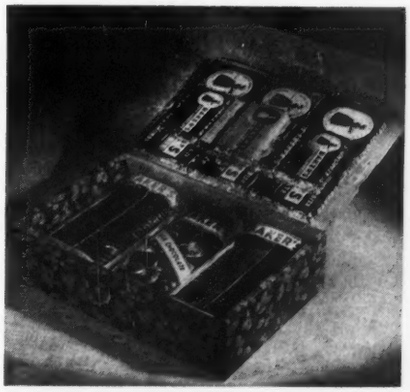
GENERAL FOODS celebrated with a purpose the 175th anniversary of the founding of Walter Baker Co., a subsidiary. It took this occasion to improve both public and industrial relations.

On October 17, Walter Baker Co. celebrated its birthday with an employee "Family Day" at its plant. Members of employees' families and friends were invited to tour the plant and carry away samples of the chocolate they had watched relatives and friends help to create. Attendance, more than 3,000, was by ticket invitation distributed by employees. As never before the home town was made aware of the importance of the contributions of the Walter Baker Co. to the economic life of Dorchester, Mass.

The occasion of the 175th anniversary of Walter Baker was further commemorated by an anniversary plate designed for the occasion. This plate depicts the village of Dorchester, Mass., in 1775, including the mill in which Walter Baker & Co. manufactured the first chocolate in America. The plate was offered (at approximate cost) to stockholders and employees in lots from one to one dozen.

The occasion was further recognized by offering at cost to stockholders and employees an attractively packaged gift assortment of the company's chocolate products. These assortments will be received as gifts this Christmas in towns and villages from coast to coast.

The food manufacturer's product itself can do much to improve public relations, so also can publicity, either by word of mouth or via the press. Included in the Walter Baker celebration was a program to improve public relations through these mediums. An anniversary luncheon was held at the Ritz-Carlton Hotel in Boston for home economists, cooking school heads, radio broadcasters and food writers in the Boston area. A similar luncheon was held at the Barclay Hotel in New York City for food columnists and writers in the New York area. Speeches were short and few. The press was impressed.



Decorative gift assortment of Walter Baker Co. products offered this year by General Foods Corp. to stockholders and employees. This assortment contains packages of new products recently added. These gift assortments will be widely distributed, building new customers for both old and new products.

The good will of the press is a valuable asset in improving public relations. In dealings with the press, food manufacturers should remember that the press is human, even though cynical. The press quickly feels sincerity or detects the phony.

Probably the most important and significant event in General Foods' program to build good will around Walter Baker Co.'s 175th anniversary was a board of directors' meeting held in Dorchester on the occasion. Fifteen General Foods directors attended. They not only toured the Walter Baker plant, meeting employees and observing first-hand a property for which they were responsible directors, but also similarly visiting other General Foods plants in the Boston area.

Probably nothing in all company relations is more important than bringing the directors, the decision makers, into personal touch with all which affects company relations. It has its beneficial effect on both employees and directors.

Hints and Hurdles

Chance to Remove Trade Barriers When State Lawmakers Convene

LEGISLATURES in 43 of the 48 States will convene again beginning in January. Existing trade-barrier laws which restrict the free movement of products between the States will be considered for revision or repeal. Revision or repeal of the more than 3,000 barrier laws has more than the sanction of the Federal government.

During the next session of the 43 States, legislative attempts will no doubt be made to pass new barrier laws camouflaged as legislation to protect health and safety or to produce tax revenue. The Federal government will more than frown on such attempts.

Paul T. Truitt, chairman of the Interdepartmental Committee of Inter-state Trade Barriers, speaking before the Convention of the International Association of Ice Cream Manufacturers in October, reflected Washington's attitude when he urged removal of interstate trade-barrier practices in the interests of efficient national defense. Truitt pointed out by an example the effect on trade when these barriers are removed, stating:

"During the biannual legislative year of 1939–40, in which the legislatures of all States were in session, very few new trade-barrier laws were passed. Various bills creating trade-barrier laws were defeated largely because the public is becoming more trade-barrier minded. Further, certain trade-barrier laws were repealed. Notably, the part of the Mississippi law taxing retail and wholesale outlets selling margarine made from domestic fats and oils was repealed in 1940. It appears that the trade-barrier qualities of the former Mississippi law were very real, since by September 1 of this year, retail and wholesale outlets of margarine in that State increased from 638 to over 1,350."

To what extent Washington could remove trade-barrier laws because of unconstitutionality is beside the point. In this case, Washington is merely pointing the way, asking agriculture, industry, distribution and legislatures to cooperate for individual, as well as national, benefit. Truitt emphasized the need of erasing all barriers to interstate trade, saying:

"Today, as the United States is forced to engage in a preparedness program of unprecedented size, it becomes more important to remove interstate trade-barrier laws with their resulting drag upon the operation of our domestic economy. Certainly, under present circumstances, we cannot produce the raw materials, finished products and services required for maintaining normal civilian plus defense activity with maximum efficiency and speed if the States continue to surround themselves with trade walls of barrier sort."

For business men who wish to aid in the removal of trade barriers, he suggested the following program:

1. "Refer all known individual trade barrier cases to some cooperating agency for solution. These agencies include the 33 districts and cooperative offices of the Bureau of Foreign and Domestic Commerce, the Council of State Governments in Chicago and the Interdepartmental Committee on Interstate Trade Barriers in Washington.

2. "Observe bills introduced into state legislatures, national Congress and in local government councils. Publicize the harmful effects of these bills on the free flow of commerce and file protests with proper local, State or Federal officials.

3. "Promote study and discrimination of educational material in individual communities regarding the socially and economically disruptive consequences of the doctrine of economic isolation."

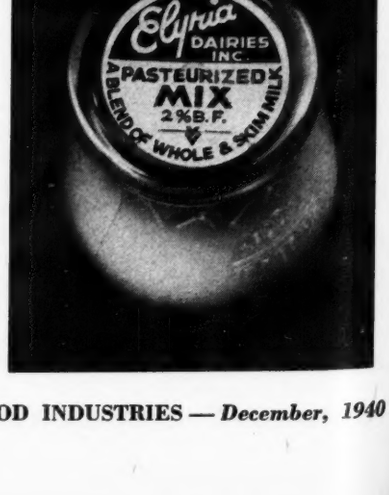
Food manufacturers have a duty in furthering defense and preparedness to give support and active aid in removing all trade barriers to interstate trade. The Federal government also has a duty which should have been performed before suggesting that States clean their statutory books of barrier laws. Washington paved the way for trade barriers against food products by the Federal magarine law. If, at the time this law was necessary to control an unhealthy situation, the law is now outmoded and superseded by pure food and drug laws. An acknowledgment by the United States Department of Agriculture indicates the margarine law no longer is necessary. The department states that an examination of the records of violations of the Federal Food and Drug Act (1906) indicates that, though early margarine legislation may have been enacted as a protective measure against fraud, the obvious objective of recent legislation establishing high margarine sales taxes and license fees is not protection from fraud. According to the department, "the practice of passing off margarine as butter has practically disappeared in recent years."

Sure It's a Good Law, But Not for Everybody

IT IS A GOOD LAW which fixes the minimum butterfat content of whole milk in the State of Ohio at 3½ percent. This law protects consumers against the sale of watered, low-fat content milk. It also protects ethical manufacturers against unethical competition.

Laws limiting the minimum fat content in milk are generally accepted as good laws, but even good laws may work a hardship on some of the people—they may discriminate against a minority. Such a case, in North Richville, Ohio, is reported in the October issue of *Practical Home Economics:*

"At the request of Dr. Martha Koehne, state nutritionist, Bureau of



Child Hygiene, a special luncheon is being prepared in the cafeteria each day. The real purpose of this lunch is to enable a trained and experienced adult to plan the food combination for the child's lunch rather than leaving it to his snap judgment as he goes down the line . . . Eight cents was decided upon as a suitable amount to charge for a lunch special, . . . many children being allowed this amount from home for a bottle of milk and a bowl of soup . . . To provide an adequate lunch for 8 cents has required a careful study of nutritional needs and food costs and the savings of even fractions of a cent, wherever possible."

The necessary cost of 3½ percent milk was too high to permit its inclusion in this balanced special lunch. However, "through the cooperation of the Elyria Dairies and with the written consent of Dr. Koehne, we are serving milk with 2 percent butter fat, a reduction almost negligible in a half-pint of milk, but one which is offset by the serving of wholewheat bread with butter on every eight-cent special. Since this milk of necessity carries a higher percentage of proteins and minerals, there is practically no nutritional loss even to the child who buys only milk to supplement the lunch brought from home.

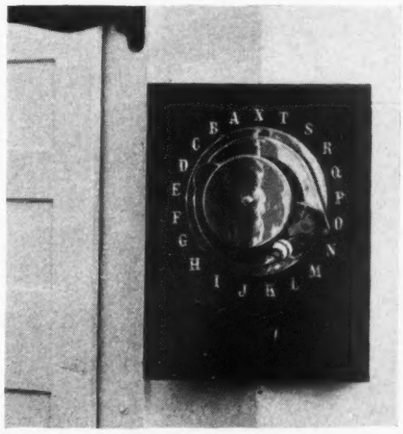
"A state law (Ohio) provides that milk must contain 3½ percent or more butterfat to be sold as 'milk.' Hence it was necessary to design a special cap for use on the bottles of milk included in the special lunch. The Elyria Dairies designed a sample cap which was presented for state approval and accepted for our use. If this had not been done our 2 percent milk would have had to be labeled 'skim milk' despite its higher butter fat content."

If low-cost 2 percent butterfat milk is the difference between adequate and inadequate diet in a school cafeteria, there must be an enormous potential for just such a product for millions of families whose present milk consumption is little or none. Dairy farmers and milk distributors need this increased volume. However, the 3½ percent butterfat law is a good law.

Cold Pack Standards Suggested by Amendment

ALTHOUGH there are no official marketing grades for cold pack fruits and berries, marketing grades do exist, if you can find them. And grading standards can be improvised as an expedient until official grades are promulgated.

An amendment to an amendment of the United States Warehouse Act "relating to standards of cold pack fruits" indicates the route to follow in searching for a cold pack fruit grade standard. The amendment reads: "Until such time as official marketing grades by the United States have been promulgated and are in effect, for the purpose of administration and regulation, the kinds and grades of cold pack fruits shall be stated as far as applicable (*a*) in accordance with standards, if standard, under the Federal Food, Drug and Cosmetic Act; (*b*) in the absence of federal standards, in accordance with the state standards, if any, established by the state in which the warehouse is located; (*c*) in the absence of any state standard, in accordance with the standards, if any, adopted by any cold pack fruit organization or by the cold pack trade generally in the locality in which the warehouse is located, subject to the disapproval of the chief of the service; or (*d*) in the absence of the aforesaid standards, in accordance with any standards approved by the chief of the service."



Control mechanism by which customer brings her individual frozen food locker around to a master door with the new automatic rotating locker system.

Customer comfort is provided by a new rotating frozen food locker system. Instead of entering a frigid room, the patron merely presses a designated button and her locker automatically moves to a point opposite a master door. Inside the revolving locker wheel is a freezing room. The system is the Armstrong Polar Wheel Locker System.

Will Domestic Freezers Help or Hurt Frozen Foods?

DOMESTIC REFRIGERATOR manufacturers, as well as many food manufacturers, have watched with personal interest the climb of frozen food sales to several hundred million pounds per year and also locker plant output reaching an equal height. Such growing acceptance for frozen food has promised a huge market for domestic refrigerators designed to freeze foods in the home. Many domestic refrigerators already have special holding compartments for commercially frozen foods. Others now have, or are including in new models, compartments for freezing foods in the home. This development is important to food manufacturers freezing foods.

The technology of food freezing has established the fact that the freezing temperature should be —20 deg. F. or below and the freezing effect such as to produce rapid freezing. Technology has also established the fact that frozen foods held at temperatures as high as 10 to 15 deg. F. permit vitamin C to be dissipated in half the time, or less, than would be the case if 0 deg. F. were the holding temperature.

The freezing and holding temperatures of many of the domestic quick-freezing units is 10 to 15 deg. F., suitable for short-time storage but too high for quick-freezing or long-time storage. The cost of operating even at these insufficiently low temperatures may discourage the use of this type of domestic freezing unit except where the power rate is exceedingly low. The results obtained from freezing and long-time holding of foods at these and possibly higher temperatures may slow down the acceptance for commercially frozen foods.

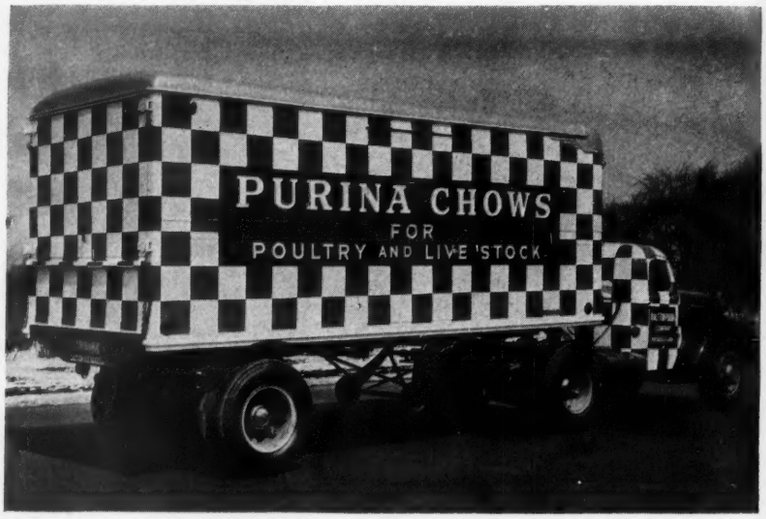
UNUSUAL TRUCK APPLICATIONS

Off the road, out in the middle of a California sugar beet field, the Ford V-8 truck pictured above gets its load by the spectacular, if not highly efficient, handful method. Out of the field, onto the paved road, it hustles its load to the nearby sugar refinery.

Trucks Move Beets, Poultry Feeds, Sugar Cane

TWO off-road operations, handling California sugar beets and Hawaiian sugar cane, feature the unusual food field truck applications depicted on this page. The third application pictured, a tractor-trailer unit, is unusual because of its striking checkerboard painting, and because it hauls Purina Chows, poultry and livestock feeds.

The Ford V-8 shown in the California beet field at the top is in the light truck class, but each of the F.W.D. diesel-engined trucks pictured at the bottom of the page hauls 9 tons of sugar cane from field to mill in the Hawaiian Islands. Picture of Ford unloading is on the next page.



Would you ever forget seeing the above unit on the road? It is one of a fleet of 17 International tractor and Fruehauf trailer units used by the Ralston Purina Co., Inc., St. Louis, to distribute 10-ton loads of poultry and live stock feeds in Missouri and Illinois.

A real tough job indeed is the task of the F.W.D. diesel-engined, six-wheel-drive trucks shown at the left. They are owned by the Kaiwiki Sugar Co., Ookala, Hawaii, and often plough through deep mud in the Hawaiian sugar fields in hauling cane from field to nearby mill.

This is the same California beet truck shown on the opposite page. A small boom derrick lifts the body up on one side of the truck chassis and out slides the entire load of beets into the hopper at a Manteca, Calif., sugar refinery.

The special hydraulic elevating tailgate shown above permits special trays of biscuits and crackers to be loaded while the gate is on the ground and then be lifted level with the trailer floor. They are then wheeled inside of the body and locked into position. The mechanism is controlled by a man standing at the rear of the trailer where he can see the entire operation.

Unloading the Beets; Hauling Biscuits, Bulk Vinegar

BECAUSE biscuits and crackers are fragile and lose value or cause customer irritation if they are broken when purchased, the Loose-Wiles Biscuit Co., Boston, Mass., employs a new and universal hydraulic elevating tailgate on the Fruehauf trailer shown at the left to reduce cracker breakage.

Wood is used for the construction of the huge 2,500-gal. tractor-trailer vinegar tank shown below because wood contains no metallic substance which might react with the vinegar to cause discoloration or give it an unpleasant taste, either of which would make it unfit for food consumption.

The giant vinegar container shown at the right is a Mack tractor and trailer which delivers its 2,500 gal. of vinegar to bottlers, pickle factories and mustard mills. It is used by the Kistler Vinegar Co., Inc., of Stroudsburg, Pa.

New Packages & Products

Have Cake and Icing Too

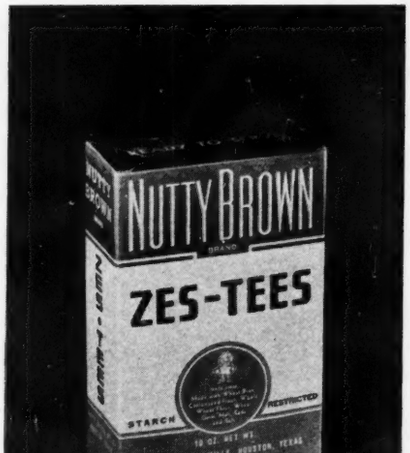
There has been a definite trend in recent years towards placing on the market food products which not only reduce kitchen drudgery and conserve the housewife's time, but which also take much of the guesswork out of home cookery. This trend has covered the field of foods from soups to desserts.

Many of the ready prepared or ready mixed foods have been bakery products, biscuits, muffins and cake mixes. A few prepared and ready mixed icings also have recently appeared. Now, prepared cake mix and icing—the complete cake in a single package—is on the market. Four different "It's a Cinch To Make" cake mix and icing preparations have been introduced: devil's fudge, white, prune, golden.

The ingredients for making cake and icing are inclosed in the outer folding carton in three separate packages, with instructions for use. These cake and icing mixes are products of Red-EE Foods, Los Angeles, Calif.

From Bulk to Consumer Size

SOME YEARS AGO smoked, baked turkey, ready to carve and eat, was placed on the market by Pines Bridge Farm, Inc., Ossining, N. Y. This product found a receptive but limited market through epicurian shops and quality outlets for food. One of the factors limiting the sale of this product was the size of the purchase. Pines Bridge Farm bids for a greater distribution with a smoked turkey product recently introduced to the market. "Smoked turkey paste," packaged in 4-oz. glass jars, contains smoked spiced turkey with turkey broth added. Packaged in this quantity, smoked turkey has a wider market potential as a meat dish for a small family, as a cocktail party tidbit or as a spread for a midnight snack.



Add No Sugar

"ZES-TEES," a prepared cereal product of Nutty Brown Mills, Houston, Tex., is a breakfast cereal which requires no added sugar. It is produced entirely from whole grains, with malt added. Wheat germ constitutes approximately 15 percent of the total weight. This product is marketed through large grocery stores, which are stocking and emphasizing the importance of "health foods" and foods which meet the requirements of those on restricted diets.

Digest of A.M.S. Standards For Canned Vegetables

Prepared for convenience of the food industries

THE following four abstracts bring up to date the series of standards for canned fruits and vegetables recently issued by the Agricultural Marketing Service. This group includes canned asparagus, canned beets, canned carrots and canned tomatoes. The complete text of the standards from which these abstracts have been made may be obtained by writing to Agricultural Marketing Service, U.S. Department of Agriculture, Washington, D.C. Each standard includes a sample score sheet.

CANNED ASPARAGUS

(Tentative)

The standard of identity for canned asparagus promulgated by the Secretary of Agriculture under Sec. 401 of the Food, Drug and Cosmetic Act of June 25, 1938, is hereby adopted for the purpose of these grades.

CULTURALLY BLEACHED asparagus is packed from asparagus so cultivated that the development of chlorophyll is retarded to the extent that (1) the stalks are practically white or yellowish white with heads which may be slightly yellowish and is known as "white" ranging from Plate 10, L-2[1] to 18, G-5, or (2) the stalks may have yellow, green or purple heads and are known as "green tipped," ranging from Plate 11, L-4 to 19, G-5.

ALL GREEN asparagus is packed from asparagus the entire length of which is green, or yellowish green—that is, may range from Plate 19, L-4 to 22, K-3.

Canned asparagus may be PEELED or UNPEELED.

ASPARAGUS SPEARS or ASPARAGUS STALKS consist of the head and adjoining tender portions of the stalks, are packed parallel as closely together as practicable without injury to the product in lengths approximately as nearly as possible the length of the can, usually not more than 6¼ in. or less than 4 in.

Asparagus tips are similarly packed, usually not more than 4 in. or less than 3¼ in. in length. Asparagus points are similarly packed, usually 3¼ in. or less in length. CUT ASPARAGUS consists of tender stalks which have been cut into pieces which usually range from 1¼ to 2½ in. in length. The product contains not less than 33⅓ per cent by count of heads. BOTTOM CUTS or SOUP CUTS consist of tender portions of the stalks other than the head and may range from ¾ to 2½ in. in length.

U.S. GRADE A or U.S. FANCY canned asparagus is surrounded by practically clear liquor; the stalks are practically straight and practically uniform in color and size, and conform to the size and count claimed for the product, unless declared to be ungraded for size. The product is practically free from defects; is very succulent and tender; possesses a normal asparagus flavor; and scores not less than 90 points.

U.S. GRADE C or U.S. STANDARD canned asparagus is surrounded by liquor which may be somewhat roily; the stalks are fairly straight and fairly uniform in color and size, and conform to the size and count claimed for the product, unless declared to be ungraded for size. The product is fairly free from defects; is fairly tender, but not markedly "fibrous"; possesses a normal asparagus flavor; and scores not less than 70 points and need not score more than 89 points.

U.S. GRADE D or SUBSTANDARD canned asparagus is canned asparagus which scores less than 70 points when scored according to the scoring system outlined herein, or when any one of the grading factors, with the exception of UNFORMITY OF SIZE, falls in the lowest subdivision.

"Normal flavor" means that the product is free from objectionable flavors or off-flavors of any kind. "Practically straight" means that the stalks do not have more than a 5 deg. curve. The minimum drained weight and the maximum head space allowable in the cans commonly used in packing canned asparagus are shown in a table in the standards. Since the Mammoth and Colossal sizes have a greater "taper," 5 percent tolerance will be allowed in the drained weight of asparagus of these sizes.

The grade of canned asparagus may be ascertained by considering, in addition to the foregoing requirements, the following factors: Clearness of liquor (15 points), color (15 points), uniformity of size (10 points), absence of defects (20 points) and tenderness and texture (40 points). The relative importance of each factor has been expressed numerically on a scale of 100. The essential variations within each factor are so described that the value may be ascertained for each factor and expressed numerically.

To determine CLEARNESS OF LIQUOR, the liquor drained from canned asparagus is poured into a suitable receptacle and allowed to stand for 10 minutes. The accumulation of flocculent particles at the bottom of the receptacle may not exceed a given percent of the height of the column of liquid, depending on the type of asparagus.

The factor "absence of defects" has reference to the care used in the preparation of the product—that is, workmanship. The presence of grit; stained, crooked, spotted or discolored spears; stalks damaged by mechanical or other means; shattered or open heads; and other defects are to be noted.

ISSUED, March 8, 1940.
EFFECTIVE, March 15, 1940.

CANNED BEETS

(Tentative)

Canned beets are prepared from any red garden variety by proper topping, washing, peeling and trimming; may be packed with the addition of water, with or without the addition of salt; and are sufficiently processed by heat to assure preservation of the product in hermetically sealed containers. Canned beets may be whole, sliced, quartered, diced, shoestring or cut (pieces not conforming to any of the above-named styles).

U.S. GRADE A or U.S. FANCY canned beets are of practically uniform color, not lighter than Plate 4, L-6, nor darker than Plate 7, J-6; are practically uniform in size and symmetry; are practically free from defects; are tender and succulent; possess a normal beet flavor; and score not less than 85 points.

U.S. GRADE C or U.S. STANDARD canned beets possess a fairly uniform color, not lighter than Plate 3, L-5; are fairly uniform in size and symmetry; are fairly free from defects; are fairly tender; possess a normal beet flavor; and score not less than 70 points.

OFF-GRADE (Substandard) canned beets are beets which fail to meet the requirements of the foregoing grades, or which fall into the lowest subdivision with respect to any one of the grading factors, hereinafter mentioned, except UNIFORMITY OF SIZE.

The maximum head space and the minimum drained weight allowable in the sizes commonly used in packing canned beets are shown in a table in the standards. If packed whole, the number of beets in the container shall conform to the counts tabulated. Official certificates of grade will indicate, in connection with the count statement, the proper count designation.

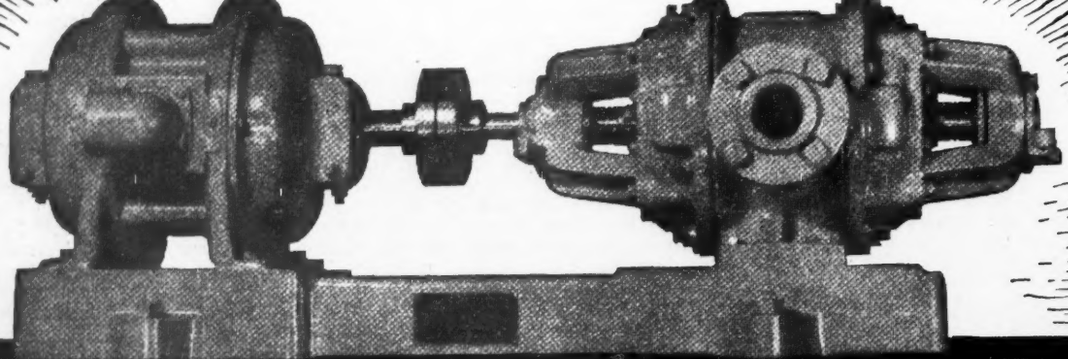
The grade of canned beets may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (20 points), uniformity of size (20 points), absence of defects (25 points), and tenderness and texture (35 points).

Cut beets shall not be scored in the

(*Turn to page* 97)

[1] The colors mentioned are according to illustrations in "The Dictionary of Color," Maerz and Paul.

CLEAN COMPRESSED AIR



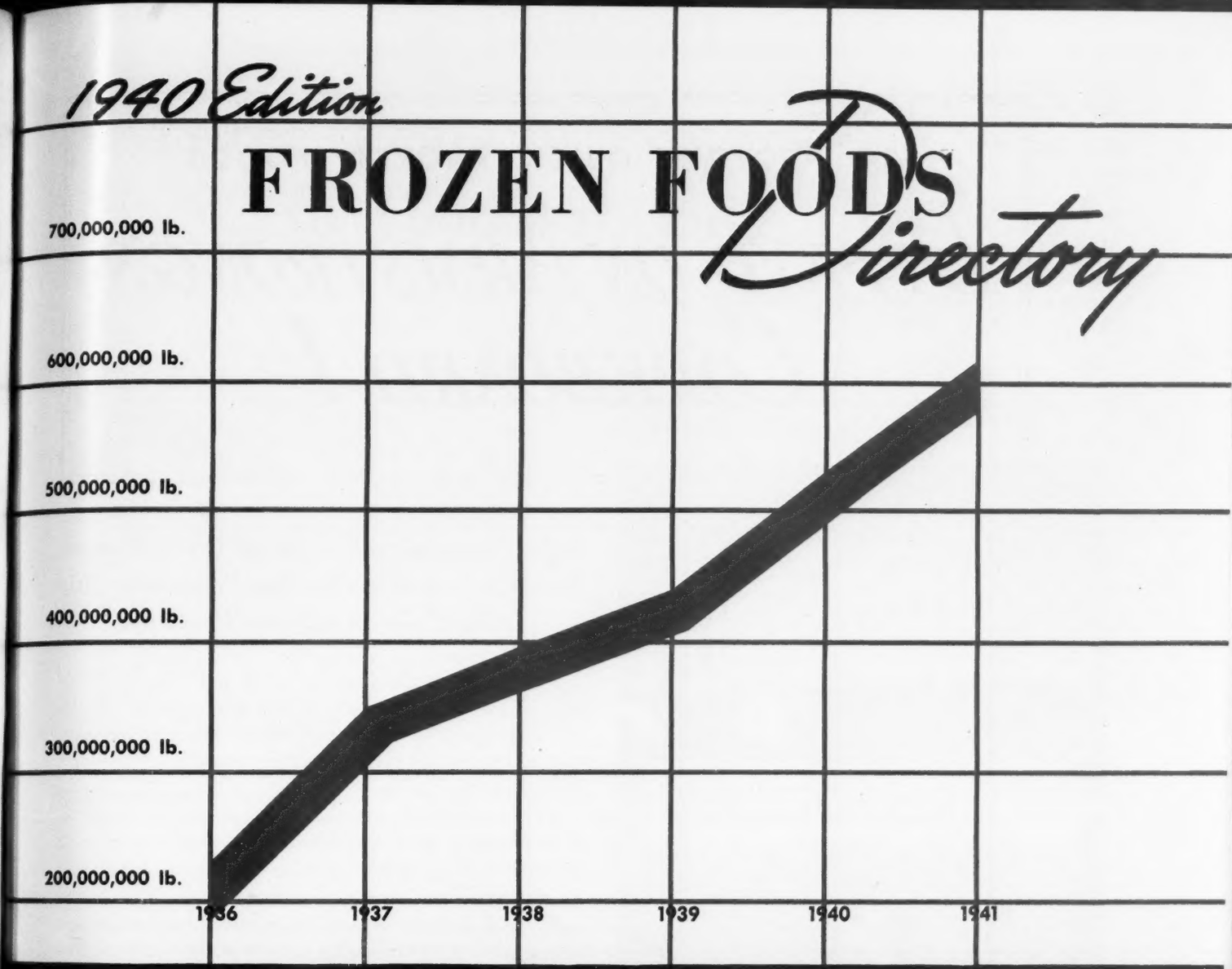
Nash Air Compressors furnish clean compressed air, free from dust, heat or oil. Nash Compressors perfectly meet the need of the Food and Chemical Industries for clean compressed air for agitating, blending, moving liquids by pressure displacement, and for maintaining pressure on storage tanks.

Nash Compressors furnish clean air without supplementary filters or air washers. They are available in any capacity. Simple, efficient, and economical. One moving part, rotating on ball bearings. No internal wearing parts in metallic contact, and no internal lubrication. Ask for Bulletin D-236.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

1940 Edition

FROZEN FOODS Directory



Freezing Continues Upward Trend

As indicated by the chart, freezing continues to increase. The chart includes slow as well as quick frozen production, covering cold packed fruit and frozen fish but not meat frozen for storage or uneviscerated poultry. The chart is based upon reported packs, since these reflect the trend more accurately than figures including estimates for unreported production. The figures, reported by 150 U. S. companies, are 439,400,000 lb. in 1939, 529,339,000 in 1940 and 618,000,000 for 1941 (anticipated). The increase expected next year is about 17 percent. Of the 1939 pack, about 30 percent was fruits, 29 percent vegetables, 31 percent fish, 8.5 percent poultry, 1.5 percent meat. Allowing for unreported production, FOOD INDUSTRIES estimates the total production as 491,000,000 lb. in 1939; 588,399,000 in 1940; 690,000,000 in 1941.

Quick freezing production is increasing more rapidly than other freezing. Taking reported figures and allowing for unreported packs, FOOD INDUSTRIES estimates the quick freezing output as 276,815,000 lb. in 1939; 353,000,000 lb. in 1940 and 439,000,000 lb. in 1941. The expected increase next year is about 24 percent. Of the quick frozen production, about 65 percent is vegetables, 20 percent fruits; 6 percent fish, 5 percent poultry and 4 percent meat.

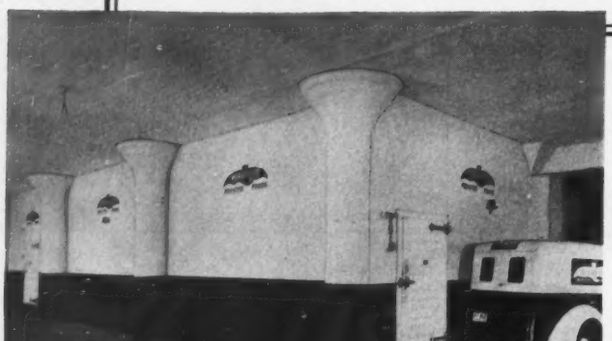
Locker plant production, which amounts to an estimated 400,000,000 lb., is not included in the above figures. This is perhaps more than three-fourths meat.

In summarizing the reports, FOOD INDUSTRIES has endeavored to eliminate duplications between packers and distributors.—THE EDITORS.

PRESENTED BY FOOD INDUSTRIES . . . A McGRAW-HILL PUBLICATION

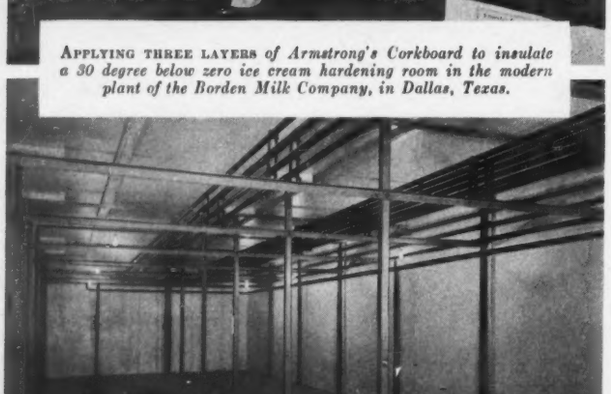
TO PROTECT QUICK-FROZEN FOODS

DEPEND ON ARMSTRONG'S CORKBOARD!



BIRD'S EYE FROSTED FOODS *are stored safely and economically in this zero room owned by the Creasey Company, Columbus, Ohio. It is insulated with eight inches of Armstrong's Corkboard.*

APPLYING THREE LAYERS *of Armstrong's Corkboard to insulate a 30 degree below zero ice cream hardening room in the modern plant of the Borden Milk Company, in Dallas, Texas.*



TEN BELOW ZERO *temperature is steadily maintained in this frozen foods storage room of the Diamond Ice & Coal Co., Charleston, West Virginia. This room and two others in this plant insulated with Armstrong's Corkboard have a capacity of 18 carloads of frozen foods.*

Safe, Economical Storage of Quick-Frozen Foods Demands the Lasting Protection This Pure Cork Insulation Provides

SAFE storage and distribution of quick-frozen foods require steady temperatures of zero or colder. That's why the rooms illustrated and hundreds like them throughout the country are guarded with dependable Armstrong's Corkboard Insulation.

This pure CORK material has an unmatched performance record in the low temperature field. For more than thirty-five years it has been accepted as the standard insulation for cold storage and freezer space. The proved safety and economy of Armstrong's Corkboard make this remarkable acceptance easy to understand.

To begin with, Armstrong's Corkboard forms a lasting, effective barrier to the passage of heat. It helps to control storage temperatures within safe ranges. It cuts refrigeration costs to a minimum. And it lightens cooling plant loads—prolongs the life of refrigeration equipment. In addition, Armstrong's Corkboard is highly resistant to moisture penetration and to deterioration. Thus, it can be counted on to serve efficiently for years, even under severe operating conditions.

Whatever your insulation needs may be, consult Armstrong's experienced engineers—available to help you plan and install insulation for maximum operating economy. Take advantage of this service now—without cost or obligation. Write for complete facts today to Armstrong Cork Company, Building Materials Division, 916 Concord Street, Lancaster, Pa.

Armstrong's
CORKBOARD INSULATION

Three Years of Progress In Food Freezing Methods

Four new methods and many refinements of older systems characterize the changes

THE following summary of methods of freezing in the United States brings you approximately up to date on the broad principles embodied in commercial freezing equipment.

Since our last review of the subject (FOOD INDUSTRIES, April, 1938) Joseph Roush has announced the mechanized freezing of foods in tin cans, sponsored by Food Freezers, Inc. Clarence Birdseye has developed the latest of his freezers, the Continuous Gravity Froster (FOOD INDUSTRIES, September, 1940). National Frosted Foods, Inc., has developed the Flexible Froster. Baker Ice Machine Co. has a new Tray Freezer.

The Frick Co. has brought out its tunnel freezer with booster compressors to produce very low temperature economically. Other significant improvements have been made in existing methods and one packaging method has been made available which, at first glance, may appear to be new freezing methods. The improvements include the changes in the Finnegan freezing machines to reduce the temperature "splits," and the development of the shaker-type of freezer by Frank Knowles which has for its purpose the freezing of individually frozen products in an air blast. The new package is the Cryo-Vac container of Dewey and Almy Chemical Co. in which the product is packaged to be frozen by air blast, sharp freezer or even immersion in a refrigerated medium.

Careful consideration of these important improvements leads to the conclusion that they represent refinements of existing methods.

The following methods, according to FOOD INDUSTRIES' views, are the commercially available methods. We make no effort to separate fast from slow freezing methods, for the actual rapidity of freezing depends on other factors than the temperature. (See FOOD INDUSTRIES, April, 1938, page 238.) And, as we have repeatedly stated in our editorial pages, the freezing method or the rate of freezing is but one factor in a successful freezing operation. Or, to put it another way, freezing itself is only one step in a sequence of operations and conditions that number at least eight, all of which must be properly carried out or failure *may* result. Furthermore, rapid freezing is not necessarily indispensable for all products.

This chain of circumstances includes time factors as well as technical methods: (1) Proper variety of raw material; (2) harvesting or procurement at the proper state of maturity or development; (3) prompt handling of the perishable raw material in the period between harvest or slaughter and its preparation for freezing in order to avoid deterioration of quality; (4) proper preparation of the raw material for freezing; (5) prompt freezing, i.e., no delays; (6) rapid freezing—though we have always felt that speed was as frequently an economic consideration as a technologic one, for it is often important to turn out an adequate tonnage; (7) proper packaging; (8) proper storage.

In the foregoing chain or sequence of conditions and events, the failure of any one of them may, and usually does, adversely affect the quality of the finished product. Which is the basis of our belief that a complete knowledge of food technology and its thorough application is of greater importance in the production of good quality frozen foods than the particular freezing method that is employed.

Sharp Freezing

Sharp freezing consists of placing the material to be frozen in a refrigerated space where the temperature is considerably below the freezing point, usually at −10 to −30 deg. F. It is probably the oldest method. Sharp freezing is used to a huge extent in locker plants, though air blast freezing in a sharp freezing room is being used in many locker installations in order to get the job done more quickly. The locker itself is not really a freezing chamber; it should be what its name implies—a storage chamber for frozen foods.

Air movement is by gravity and is slow in sharp freezers. If mechanical means are employed for greatly speeding up the air movement, the freezing method is more properly classifiable as air blast freezing. Just where the transition point occurs is not a settled matter. Freezers that employ shelf coils on which the product freezes in pans are properly included under sharp freezing, provided that the air is not subject to forced circulation.

Air Blast Freezing

As the name implies, air blast freezing depends on a high velocity, forced-air circulation for the secondary refrigerating medium by which the heat is removed from the food being frozen and carried to the refrigerating coils.

The term "air blast" thus really refers to a method of heat removal rather than to a mechanical device for freezing; for if the food is being moved mechanically through the air blast, the system is almost certain to be a tunnel freezer because a tunnel affords a convenient method of housing a conveyor or a procession of trucks carrying the food to be frozen. The important technical consideration in air blast freezing is the reduction of the temperature "split" or differential to a minimum so as to minimize the dehydration of the product and frosting of the coils.

The original Murphy freezer was properly an air blast freezer in which the product was stationary on pans resting on shelf coils while the air circulation was forced.

Frick Company has used cold plates and shelf coils in addition to air blast.

In Wenatchee, Ore., are two Baker installations, one of which is called tray freezing. It consists of a battery of individual chambers for air blast freezing of products spread on trays in trucks, one truck to a chamber. Each chamber is individually controlled. Because the method appears to be an air blast system it is included in that category.

Tunnel Freezing

Belt and Tray Freezing

As previously indicated, a tunnel freezer is usually an air blast freezer in which the loose product is frozen as it progresses through the refrigerated air blast—inside an insulated tunnel. In some systems the product

to be frozen is on a belt; in others the product is on trays carried on trucks which are moved through the tunnel. Though in the Pacific Coast States the latter method is frequently called tray freezing, it is included under tunnel freezing in this discussion.

Many variants of tunnel freezing are to be found, of which most of the following are fairly well known. Designers of belt freezers attempt to avoid the mechanical problem of the individual food particles freezing into clumps or slabs. In the custom freezer at Dover, Del., designed by Henry Sterling, the product is intermittently agitated by an upward air blast through the openings in the belt. The shaker type of freezer designed by Frank Knowles of Seattle continually shakes the product while it is freezing to avoid sticking.

On the other hand, where tray freezing is employed, the disintegration of the clumps takes place after the freezing operation is completed, such as is done with the Finnegan Multistage Freezer. Though the product freezes as a slab it is easily disintegrated afterward into individual pieces for packaging.

Other freezing systems in the tunnel freezing group are those developed by Frick Co., Baker Ice Machine Co., York Ice Machine Co., Carrier Corp. and Ralph V. Grayson.

Single-contact Freezing

In single-contact freezing the heat is removed from the product by contact with a single refrigerated surface made of metal. The product may be loose like peas or lima beans, in pieces such as fish fillets, or it may be in packages. The process of heat transfer from product to metal is the principal difference between this scheme and the previously mentioned groups where the heat transfer is chiefly from product to air and thence to metal.

One of A. H. Cooke's patents owned by Atlantic Coast Fisheries Co. employs a flat aluminum plate with fins that dip into refrigerated brine for freezing fillets laid flat on the plate. (This patent is not to be confused with another Cooke patent now owned by Booth Fisheries Co. and which is said to be the basis of certain pending litigation. In view of possible future judicial interpretation of exactly what the patent covers we abstain from discussing it except to point out that its present owners are said to claim it has priority over some of General Foods patents covering double-contact freezing under compression.)

Other freezing methods employing single contact are: One designated by its owners as "modified compression contact" in which packaged foods are frozen on a refrigerated plate with a weight on top to improve the contact; and the Kolbe floating-pan system. The Gravity Froster recently announced by Clarence Birdseye seems to belong in this group, but this may perhaps be an erroneous classification. It combines single contact of product and a refrigerated metal surface with air blast to increase the rate of heat removal. (Food Industries, September, 1940, page 44).

The movement of refrigerated air plays a minor role in single-contact freezing.

Double-contact Freezing

Birds Eye frosted foods are frozen in freezing machines that employ double contact and pressure on the packages which contain the product. Patents granted to Clarence Birdseye, James J. Barry and others on this method are owned by General Foods Corp., but licenses to use the multiplate frosters are occasionally granted to others under certain restrictions. Originally the principle was applied by placing the packages between two traveling metal belts, but more recently the machine embodies refriger-

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One Service Call in 18 Years—
A Testimonial to LIPMAN Trouble-Free Operation and Long-Term Dependability
The performance record of thousands of Lipman installations in all parts of the world under all kinds of working conditions is proof that you can count on Lipman Refrigeration for many years of uninterrupted service. It is your assurance that Lipman combines highly efficient refrigeration with low-cost-of-ownership expressed in terms of trouble-free performance, freedom from costly repairs and maintenance, and minimum depreciation.
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ated plates instead of traveling belts.

The double-contact method is also employed in the Flexible Froster of National Frosted Foods, Inc. This unit utilizes a flexible refrigerating surface consisting of a series of rubber bags through which a liquid refrigerant at very low temperature is circulated. The product to be frozen is placed between these bags and the elastic refrigerating surface adapts itself to the contour of the product.

Spray or Fog Freezing

In this method of heat removal the product may be loose on wire screens or packaged in waterproof packages. A refrigerated liquid is pumped over it either in the form of a spray or a fog—a method invented by M. T. Zarotschenzeff and commonly called the "Z" method. Products such as berries are frozen loose by the use of a refrigerated sirup spray and then packaged after draining off the sirup. Vegetables are frozen in much the same way except that the secondary refrigerating medium is a neutral solution of sugar and salt. Fish and poultry are packaged first and spray-frozen on a stainless steel conveyor.

Block-ice Freezing

Pan freezing of fish by placing them in a pan of water set on refrigerating coils is one of the older methods of freezing. On the West Coast, the Haslacher method has used somewhat the same procedure except that the food to be frozen is placed in water in an ice can and immersed in the brine of an "ice field." It can be done in any ice plant.

Immersion Freezing

R. Brooks Taylor of the Tennessee Engineering Experiment Station is largely responsible for developing the "Tennessee" method of automatic continuous immersion of the food into a refrigerated sirup, freezing it solid in a few minutes. The next step is removing the frozen material to a self dumping centrifuge which spins off the adhering sirup. The product is then packaged.

The method developed by Food Freezers, Inc., is tentatively classified as an immersion method. Here the product is sealed in tin cans, immersed in a refrigerated liquid and rotated slowly until frozen solid.

Another immersion method is the "Texas" method recently developed at the Texas Engineering Experiment Station under the leadership of W. R. Woolrich.

Unclassified Methods

One of William J. Finnegan's freezers is a submerged tube device with the tubes surrounded by a liquid at about —40 deg. F. As applied to juice freezing, a succession of cans is pushed slowly through the tubes. Freezing occurs in about 15 minutes for No. 2 cans.

John N. Crider's "Cridericed" method of poultry freezing is difficult to classify because it freezes from the inside out by inserting a paper tube into the eviscerated body cavity and pumping —3 to —5 deg. F. brine through it.

Acknowledgments

To all who have cooperated in the preparation of this directory and tabulation of frozen food production, the editors extend their thanks. The purpose is to facilitate frozen food manufacturers in finding markets and to furnish a statistical guide.

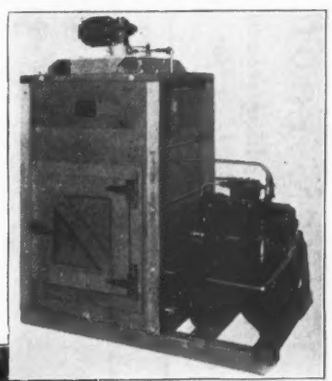
Lacking any authority to compel manufacturers to report their production accurately, we depend solely on their spirit of cooperation, which has been gratifying indeed.

Additional copies of the third Frozen Foods Directory may be obtained at a cost of 35 cents each. In lots of 10 or more the cost will be 25 cents each.

DOLLARS SAVED on ICE COSTS WILL PAY FOR A VILTER PAKICER!*

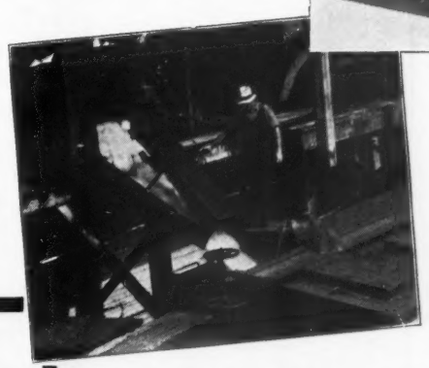
CRYSTALFORM PAKICE — BETTER ICING AT LOWER COST.

Vilter PAKICE is saving money for hundreds of plants in the Food and Meat Packing Industry. It is the most economical form of ice for packing perishables—milk, vegetables, fish, poultry; for mixing with sausage meat; for solution cooling and many other purposes. Can be handled as easily as snow. Lasts longer than other forms of ice. Saves time and labor, too.



PAKICE BRIQUETTES FOR CAR ICING

Pakice in Briquette form saves time, labor, and money in car icing. Made in special Briquette attachment, available on Pakice Units of 15 tons and up. Can be made near loading platform, stored like coal, and chuted to platform trucks or directly into car bunkers.



Typical Vilter Pakice Car Icing Installation. Pakice Briquettes are spouted from storage bin to platform truck and chuted in car bunkers.

Vilter ½ ton Pakicer completely Self-contained. Requires only water and power connections. Other Pakice Units—1, 2½, 5 tons and up to 30 tons in 5-ton increments.

SOLUTION COOLING . . .

Vilter PAKICE, in original Crystalform or in Briquettes, is particularly adapted to Solution Cooling. Crystalform PAKICE will melt rapidly and evenly in a warmer solution. It is manufactured ON THE JOB, ready for use without crushing. PAKICE Briquettes are of even size and will also melt evenly . . . They're easy to handle —without crushing losses.

**In many Plants Saving in Ice Costs Pays for Pakice Equipment in TWO YEARS or less—depending on local power costs.*

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FROZEN FOODS DIRECTORY

The companies listed in this directory are those engaged in packing frozen foods of all kinds and by all methods for the commercial market. Locker plants are not included. Some major distributors which contract for their output are listed because they are major factors in the industry.

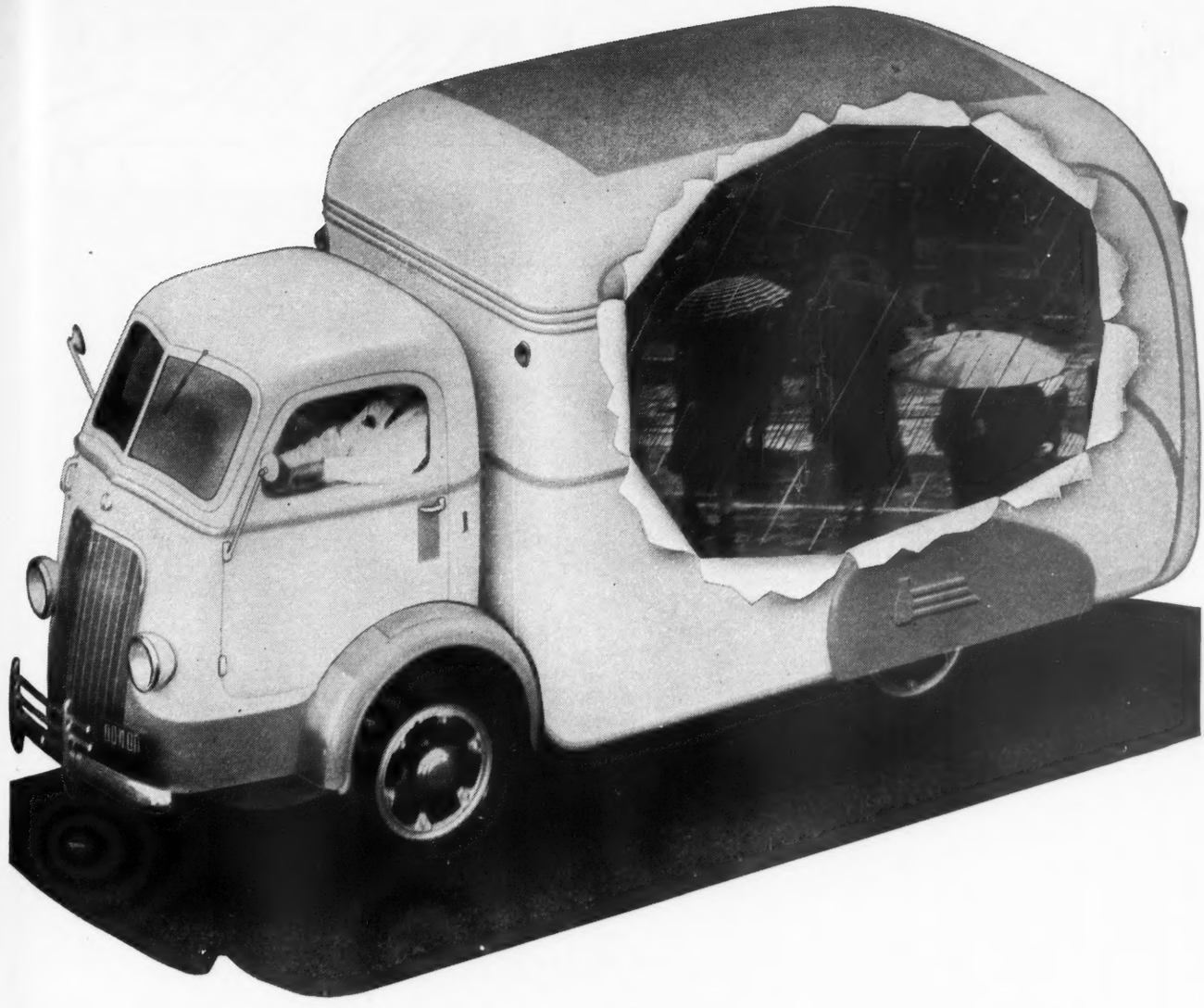
Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Allen Fruit Co. 295 Front St., Salem, Ore.	.....	.....	Strawberries, raspberries, peaches, cherries, prunes, apricots, loganberries, blackberries, corn, peas.	.....	.....	.....	.....	.....
American Fish Co. 19 Fish Pier, Boston, Mass.	Boston.....	U. S.....	Haddock, cod, and perch fillets; H & G whiting, mackerel	Wooden boxes (10, 15 lb.).	Sharp.....	1,277,300	1,313,000	1,500,000
Armour & Co. Union Stock Yards, Chicago, Ill.	St. Paul, Minn.; Des Moines, Iowa; Fort Worth, Tex.	Cloverbloom; Gold Band	Poultry only.....	Wooden boxes (6 birds to the box)	.....	.....	.....	.....
Associated Berry Growers Cooperative Exchange Hatzic, B.C., Canada	Hatzic, B.C.....	.....	Strawberries, raspberries, loganberries, blackberries, red and black currants, meats, fish	For berries, 40-gal. barrels, fir, paraffined	Sharp freezer	.....	.....	.....
Atlantic Coast Fisheries Co. No. 4 Fish Pier, Boston, Mass.; and Provincetown, Mass.	Provincetown, Mass.....	Nordic, Atco, Frigidsea, Atlanco	Fish and seafoods: Haddock, cod, flounders, gray sole, pollock, hake, ocean redfish, cusk, scallops, whiting, mackerel, squid	Waxed cartons (1, 5 lb.), fibre cartons (10 lb.), asphalt cartons (10 lb.), wood shooks (10, 15 lb.)	Sharp freezer; air blast; Birds Eye	May 1, 1939, to April 30, 1940, 8,190,300		
Barnes & Fisher Sodus, N.Y.	Wallington, Williamson, Lyons, N.Y.	No brand.....	Strawberries, RSP cherries, prunes.....	Tins (10, 30 lb.).....	Air blast, 10 deg. below zero to zero	2,000,000	2,000,000	2,000,000
Batchelder & Snyder Co., Inc. 47 Blackstone St., Boston, Mass.	Boston, Mass.....	Birds Eye, Snyder-Grade, Ocean-Supreme	Meats.....	.....	Birds Eye.....	Output included in that of Frosted Foods Sales Corp.		
H. C. Baxter & Bro. Brunswick, Me.	Corinna, Me.....	Birds Eye, Cold-seal	Peas, beans, cut corn, corn on cob.....	Waxed paper cartons, transparent-cellulose liners (12, 13 oz.); institutional (2½, 5 lb.)	Birds Eye.....	2,836,600	2,315,000	About same
Bellevue Creamery & Produce Co. Division of Omaha Cold Storage Co., Omaha, Neb.	Omaha, Neb.....	Ocoma, Takoma...	Poultry.....	Consumer cartons and wholesale, restaurant and institutional packages	15 to 20 deg. below zero	3,000,000	4,000,000	3,000,000
Beutel Canning Co. Bay City, Mich.	Bay City, Mich.....	Michigan.....	Asparagus, peas, green beans, wax beans, lima beans, spinach, squash, corn, raspberries (in barrels)	Transparent-cellulose bags in wax cartons (10, 12 oz.; 2, 2½, 3 lb.) barrels	Murphy system (conduction–convection); most products frozen loose	650,000	800,000 approx.	
Blue Lake Producers Co-op. P. O. Box 574, Salem, Ore.	Terminal Ice & Cold Storage Co., Salem, Ore.	Buyer's labels.....	Strawberries, loganberries, youngberries, blackberries	Tins (15, 30 lb.).....	Sharp freezer.....	42,485	None.....	200,000
Bluepoints Co., Inc. W. Sayville, N.Y.	.....	.....	Oysters.....	.....	Birds Eye.....	Output included in that of Frosted Foods Sales Corp.		
BobWhite Frosted Foods Corp. 155 East 44th St., New York, N.Y.	.....	BobWhite.....	Meats.....	Cartons.....	Dole plates, 25 deg. below zero	.....	8,000 per week	.....
R. D. Bodle Co. 71 Spring St., Seattle, Wash.	Seattle, Lynden, Everett, Puyallup, Kent, Tacoma, Wash., Portland, Hillsboro, Ore.	Bodle's, Totem....	Strawberries, blackberries, youngberries, raspberries, loganberries, black raspberries, gooseberries, huckleberries, olympic berries, peaches, plums, prunes, apricots, rhubarb, cherries (both sweet and sour), asparagus, broccoli, carrots and peas, cauliflower, corn on cob, whole kernel corn, peas, green beans, lima beans, wax beans, spinach, brussels sprouts, succotash, zucchini	Cartons, transparent-cellulose lined (10, 12, 16 oz.; 2½, 5, 10 lb.); cups, lined with transparent cellulose (1 lb.); tins (10, 15, 30, 50 lb.); fiber cartons (30 lb.); wood boxes (30, 32, 40 lb.); wood barrels (50 gal.)	Sharp freezer, tunnel freezer, air blast, zero to 35 deg. below	13,000,000	15,000,000	16,000,000
Booth Fisheries Corp., "Tastyloin Division," 309 West Jackson Blvd., Chicago, Ill.	Boston, Mass.; Buffalo, N.Y.; Chicago, Ill.; Seattle, Wash.	Booth Tastyloins, Booth Seafoods (also private brands if required)	All fish and seafoods, both fresh-water and salt-water, including: Haddock, ocean perch, grey sole, flounder sole, swordfish, halibut, green shrimp, cooked, peeled and cleaned shrimp, cape scallops, crabmeat, lobster meat, oysters, clams, lake perch, blue pike, yellow pike, sauger pike, whitefish and salmon	11 and 14 oz., and 1 lb. consumer sizes; 5 lb. institutional size. All merchandise wrapped in transparent cellulose	Cooke multiple-plate freezer	43,000,000 to 44,000,000 in a year		
Booth Fisheries Corp. 309 West Jackson Blvd., Chicago, Ill.	At all Booth branches on the Atlantic, the Pacific, the Great Lakes and Canadian lake territory	Red Diamond, Bofisco, and Seatang	All fish and seafoods of every kind and description	All sizes of packages from 10 lb. up; also loose or bulk packages frozen singly	Hendron plate freezer, Colby freezer, air blast freezer, immersion process and sharp freezing			
Bowes Co., Ltd. 76 Front St., E. Toronto, Ont., Canada	Toronto.....	Bowes.....	Strawberries, raspberries, cherries, blueberries, apples	Tin, wood containers (20 to 40 lb.)	Sharp freezer..... 10 deg. below zero	675,000	700,000	750,000
Bozeman Canning Co.	Monroe, Wash.....	Frigifoods.....	Peaches, raspberries, boysenberries, etc.;	Cartons (10, 12 oz.; 1, 2	Air blast, 40 deg.	1,379,973	2,700,000	3,200,000

Bozeman Canning Co. Mt. Vernon, Wash.	Monroe, Wash.	Frigifoods	Peaches, raspberries, boysenberries, etc.; strawberries, peas, string beans, corn, spinach, broccoli, cauliflower, brussels sprouts	Cartons (10, 12 oz.; 1, 2, 2½, 5 lb.); cans (10, 15, 30 lb.) fiber cases (25–30 lb.); fiber cans (5 lb.)	Air blast, 40 deg. below zero	1,279,073	2,700,000	3,200,000
Brakeley Canning Co. P.O. Box 163, Bordentown, N.J.	Exmore, Va.	Brakeley	Fruits, vegetables, sea foods	10, 12, 16, 40 oz.; 10, 15, 30, 50 lb.	Finnegan freezer, "Z" system	.....	.....	.....
N. W. Brewer. Route 1, Rochester, Wash.	Tacoma Ice & Cold Storage	N. W. Brewer	Strawberries, blackberries, youngberries	Barrels (30, 50 gal.), tins (30 lb.)	.....	193,500	425,000	500,000
Bridgeman-Russell Co., Inc. Duluth, Minn.	.....	None	Peas, snap beans, corn on cob, strawberries, raspberries, blueberries	Bulk	.....	.....	.....	.....
Brookfield Creamery, Ltd. Truro, N.S., Canada	Truro, N.S.	Brookfield	Chickens	Cryo-Vac	Sharp freezer, 10 deg. below zero	25,000	25,000	25,000
J. D. Brown. Huntingdon, B.C., Canada	Commercial freezers	.....	Red raspberries	Paraffine lined fir casks (375 lb.)	Sharp freezer	.....	99,335	.....
Brown Packing Co. Christian & Howard Sts., Philadelphia, Pa.	Philadelphia; Plant City, Fla. (Operations start in Florida and move with seasons to various parts of country)	Brown's Select	Apples (sliced), apricots, blueberries, blackberries, RSP cherries, loganberries, peaches (yellow and white), pineapple, plums, pumpkin, raspberries, (red, black, seedless), rhubarb, strawberries, currants, pineapple-cocoanut, tangerine, cranberry puree, nectarine puree, plum puree, strawberry puree, peas, corn (cut), corn on cob, lima beans, string beans, wax beans, spinach, carrots and peas, asparagus, succotash	Cartons, wax-paper covered, transparent-cellulose lined (10, 12, 16 oz.); tins, enamel lined (2½, 5, 10, 15, 30, 35, 38, 40 lb.); kegs (10, 15 gal.); barrels (30, 50 gal.)	Air blast at sub-zero temperatures for small packages; sharp freezer for bulk containers	20,000,000	22,000,000	25,000,000
Joseph Buchwald & Co. 855 McAllister St., San Francisco, Calif.	.....	.....	Berries, cherries	.....	.....	.....	.....	.....
California Consumers Corp. 230 W. Jefferson Blvd., Los Angeles, Calif.	Pasadena, Los Angeles, Calif.	Trujuis, Pure Froz-n, California Frozen, Full Tide, Green Tide, Prime Froz-n, Magic Meals, Tru Froz-n	Citrus juices, pomegranate, peaches, apricots, nectarines, boysenberries, youngberries, strawberry puree, lima beans (Fordhook), asparagus, brussels sprouts, broccoli, cauliflower, squash, string beans, spinach. Custom freezes turkeys, meats, fish, shrimp. Quick freezes cooked foods	Cans (12, 30, 96 oz., 6 gal.), cartons (10 oz. to 30 lb.). Transparent cellulose, wax paper and wax cartons used	Finnegan tubes, with alcohol brine at 35 deg. below zero; shelf freezers, with and without air blast	7,800,000	9,455,000	11,000,000
Canadian Frosted Foods, Ltd. P.O. Box 543, Whitby, Ont., Canada	Toronto	Del Glacio	Strawberries, raspberries, cherries, peaches, peas, asparagus	Cartons (1, 2 lb.); cans, pails (5, 12, 22 lb.); flat packages (12 oz., 2½ lb.)	.....	Small	Small	Small
Canal Fish Co. Sandwich, Mass.	Sandwich, Mass.	None	Fish	Boxes (60, 120 lb.)	Indirect system, sharp freezers, zero to 5 deg. below	1,000,000	800,000	.....
H. P. Cannon & Son, Inc. Bridgeville, Del.	Bridgeville, Del.	.....	Lima beans	Wax-impregnated carton with wax paper wrapper and transparent-cellulose bag inside (5 lb.)	Finnegan	.....	.....	.....
Cascade Frozen Foods, Inc. 2202 1st Ave. So., Seattle, Wash.	Burlington, Seattle, Puyallup, Kennewick, Wash.	Jack Frost, Agen's Quick Freeze	Asparagus, green beans, lima beans, carrots, cut corn, corn on cob, peas, peas and carrots, spinach, blackberries, huckleberries, cherries, gooseberries, loganberries, peaches, raspberries, strawberries, boysenberries, olympic berries, youngberries, broccoli, cauliflower, brussels sprouts	Flat packages; waxed cartons, open end and suitcase style, overwrapped with transparent cellulose or waxed paper; waxed cartons; waxed paper cups; sizes: 10, 12 oz.; 1, 2, 2½, 3, 4, 5 lb.; 5 and 10 lb. (tins and flats), 30 lb. (tins), 30 lb. (cartons)	Air blast	1,200,000	2,250,000	4,000,000
Cedergreen Frozen Pack Corp. Wenatchee, Wash.	Wenatchee, Monroe, Wash.	Cedergreen	Strawberries, red raspberries, black raspberries, peaches, apricots, boysenberries, youngberries, loganberries, blackberries, wild blackberries, sour cherries, sweet cherries, prunes, red currants, apples, peas, cut corn, cob corn, green beans, wax beans, asparagus, green lima beans, peas and carrots, spinach, broccoli, brussels sprouts, cauliflower, squash, succotash	Open end, white, patent coated, solid manila; also natural sulphite (12 oz.; 1, 2½, 5 lb.), also same in two-piece carton. Telescope fibre cartons, waxed-paper lined (30 lb.). Consumer, institutional cartons lined with transparent cellulose. All size tins and barrels	Air blast, 35 deg. below zero	1,700,000	3,000,000	4,000,000
Central Fruit Distributors, Ltd. Mission City, B.C., Canada	.....	Everfresh	Strawberries, raspberries, black currants, loganberries	Barrels, fir, paraffine-lined (40 gal.)	Sharp freezing	70,000	200,000	.....
Cherry Growers, Inc. 709–15 E. Front St., Traverse City, Mich.	Traverse City	Montmorency, Reddi-Maid	Cherries, apple slices	Cans (10, 15, 30 lb.)	.....	3,751,000	5,679,000	6,000,000
Chickamauga Producers, Inc. Cleveland, Tenn.	Cleveland, Tenn.	Tennessee Individual Quick Frozen	Strawberries, lima beans, garden peas, snap beans, corn, sliced peaches, poultry. (Berries, beans, peas, frozen individually)	Cartons with transparent-cellulose liners (1, 2½, 5 lb.), tins (10, 20, 30 lb.)	Immersion freezing at 0 and 5 deg. above. Strawberries freeze in 6 min.; lima beans, peas, 30 to 50 sec.; corn on cob 20 min.	None	530,000	1,000,000
Cincinnati Fruit & Extract Works. 422 W. Fourth St., Cincinnati, Ohio	Hammond, La.; Cincinnati, Ohio	Reyam	Strawberries, raspberries (red and black), peaches, melons	Wood barrels (50 gal.)	Sharp freezer, zero and below	150,000	160,000	160,000
Citrifrost Distributors, Ltd. 2720 Pico Blvd., Los Angeles, Calif.	Pico, Calif.	Citrifrost	Orange, grapefruit and lemon juices	Rubber hydrochloride bags (1 qt.) (Pliofilm)	Air blast	20,000 gal.	50,000 gal.	200,000 gal.

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Clyde Kraut Co. Clyde, Ohio	Toledo Public Storage	Silver Fleece	Cherries	Tin (15,30 lb.)	Zero	135,000	None	No estimate
Comstock Canning Corp. Newark, N.Y.	East Pembroke, N.Y.	Comstock	Peas, beans, corn, cherries, peaches	Paper package (12, 40, oz.); tin (30 lb.)	Sharp freezing, air blast	.....	.....	.....
Consumer Packing Co. Lancaster, Pa.	Lancaster, Pa.	Consumers	Asparagus, peas, spinach, string beans, lima beans, corn, strawberries, peaches, raspberries, chickens, ducks, turkeys; beef, veal, lamb, pork are frozen primarily for locker customers	Waxed paperboard box with transparent-cellulose bag and waxed wrapper (12 oz.); tubs (6 lb.)	Air blast and shelf coils	300,000 (87% of production is for locker patrons)	425,000	750,000
Coryell Commercial Center. Lincoln, Neb.	Lincoln, Neb.	Coryell 70	Poultry of all kinds (meats for locker customers)	.....	Sharp freezer, air blast, 20 deg. below zero	100,000	100,000	.....
B. Frank Craddock Co. Humboldt, Tenn.	Humboldt, Dyersburg, Ripley, Tenn.	B. Frank Craddock, O Keena Club	Strawberries, green beans, spinach, corn on cob	5, 10, 20, 30 lb. containers. Tins, barrels, cartons, all packed against dehydration	Air blast at 15 deg. below zero; "Z" process; Craddock process (sugar-brine quick freeze)	300,000	400,000	2,000,000
T. W. Crocker Co., Ltd. New Castle, N. B., Canada	Newcastle, N. B.	Diamond C	Blueberries, salmon, shad, shad roe, smelts, mackerel	30 lb. wood boxes, wax-paper lined; 10, 15, 100, 150, 200 lb. boxes	Sharp freezer, zero to 20 deg. below	700,000	550,000	800,000
Crown Packing Co. Grand Island, Neb.	Grand Island, Neb.	Gilt-Edge	Pork, beef, veal, lamb, poultry, fancy meats, glands	30, 60 lb	Sharp freezer, 20 deg. below zero	.....	.....	.....
Cudahy Packing Co. Chicago, Ill.	Omaha, Kansas City, Sioux City, St. Paul, Wichita	Puritan Select	Meats	Tin pails (5, 10 lb.)	Sharp freezer	.....	.....	.....
Curtice Brothers Co. Rochester, N. Y.	Brockport, N.Y.	Blue Label and buyers' brands	Peas, corn, beans	Cartons (12 oz.; 2½, 5 lb.), transparent-cellulose liners; bags (40 lb.)	Air blast	9,875	584,488	.....
F. L. Daggett & Co. Norfolk, Va.	Norfolk, Va.	Norfolk Fruit Packing Co.	Strawberries	Tins (30, 50 lb.); barrels (450 lb.)	Cold storage, zero to 10 deg.	535,000	838,000	800,000
Davis-Cleaver Produce Co. 235 N. Fourth St., Quincy, Ill.	Quincy, Ill.	Ferndale	Poultry	Individual cartons; institutional (12 to box); cans (18 to can)	Sharp freezer	150,000	250,000	250,000
Deerfield Packing Corp. Bridgeton, N. J.	Bridgeton, N. J.	Deerfield	Asparagus, peas, snap beans, lima beans, broccoli, cauliflower, cranberries, corn, brussels sprouts, spinach, apples, squash	Consumer and institutional packages	Birds Eye; Deerfield quick freezers	Slightly less than 1938, which was 30,000,000	Appreciably more than in 1938	.....
DeJean Packing Co. Pine St. & East Beach, Biloxi, Miss.	Biloxi, Miss.	My-T-Good	Shrimp	Waxed carton (5 lb.)	Air blast, 12 deg. below zero; contact, 12 deg. above	200,000	400,000	800,000
Delnor Frosted Foods, Ltd. New Westminster, B. C., Canada (Operates business formerly handled by Broder Canning Co., Ltd.)	New Westminster, B. C.	Delnor	Peas, green beans, corn kernels, corn on cob, spinach, asparagus, peaches, apricots, cantaloupe, strawberries, raspberries, loganberries, blackberries, blueberries, salmon	Waxed cartons (10, 12 oz.; 2½, 5 lb.); pails (25 lb.)	Air blast	.....	.....	.....
DeSoto Creamery & Produce Co. 71 Island Ave., W., Minneapolis, Minn.	.....	.....	Turkey	.....	.....	.....	.....	.....
John H. Dulany & Son. Fruitland, Md.	Exmore, Va.	Dulany	Vegetables: Asparagus tips, asparagus cuts, broccoli, brussels sprouts, cauliflower, corn (cut), corn on cob, green beans, wax beans, lima beans, peas, peas and carrots, pumpkin, spinach, squash, succotash, mixed vegetables. Fruits: blueberries, cherries (red pitted), peaches, pineapple, raspberries (red, black), rhubarb, strawberries, orange juice. Seafood: Mackerel, sea trout, shad, haddock, sole, perch, flounder, shad roe, soft shell crabs, crab meat, shrimp (cooked, uncooked), scallops, clams, oysters	Consumer size: 10, 12, 14, 16 oz. transparent-cellulose-lined cartons; institutional size: 2, 2½, 10 lb. transparent-cellulose-lined cartons; 10, 50 lb. inner sealed bags; 10, 15, 30, 50 lb. enamel-lined cans; 30, 50 gal. barrels	Finnegan	.....	.....	.....
Eau Claire Packing Co. Eau Claire, Mich.	Eau Claire, Mich.	.....	Black raspberries, cherries	Tins (20 lb.); barrels (400 lb.)	Sharp freezer	.....	About 200,000 a year	.....
Elyria Canning Co. Elyria, Ohio	Cleveland	Moss Rose	Rhubarb, strawberries, raspberries, blackberries, cherries, elderberries, youngberries, plums, prunes	Tins (10, 15, 30 lb.); barrels (50, 55 gal.)	Sharp freezer, 20 deg. below zero	.....	.....	.....
L. J. Essees. Montesanto, Wash.	Commercial freezer	.....	Blackberries (wild Evergreen)	Barrels (385 lb.)	.....	385,000	None	.....
Eugene Fruit Growers Association. Eugene, Ore.	Eugene, Junction City, Ore.	Diamond A	Cherries, berries	Barrels; tins (30 lb.)	.....	Small	Small	Small
Exchange Orange Products Co. Ontario, Calif.	.....	.....	Orange and lemon juice (frozen only on order)	Cans	.....	Small	Small	Small
F&M Packing Co. Traverse City, Mich.	Traverse City, Mich.	None	RSP cherries	Enamel-lined tins (30 lb.): barrels (50 gal.)	Sharp freezer, 20 to 25 deg. below zero	480,000	680,000	.....
Fairmont Canning Co. Fairmont, Minn.	Fairmont, Minn.	Frigidettes	Peas, whole kernal corn, cob corn, lima beans, carrots and peas, squash	Cartons (12 oz.; 2½, 5, 20, 30 lb.)	Tunnel with moving belt, air blast, 30 deg. below zero	4,800,000	5,300,000	6,500,000

Fairmont Canning Co., Fairmont, Minn.	Peas, whole kernal corn, cob corn, lima beans, carrots and peas, squash	Frigidettes	barrels (30 gal.) Cartons (12 oz.; 2½, 5, 20, 30 lb.)	25 deg. below zero Tunnel with moving belt, air blast, 30 deg. below zero	4,800,000	5,300,000	6,500,000



IT'S ALWAYS "RAINING"
inside the walls of your insulated truck

When vapor-laden clouds strike cold air, rain begins to fall. Similarly, when water vapor in the air slowly seeps inside the walls of your insulated truck and strikes the cold interior, moisture condenses on the insulation. Sealing cannot keep out all this water vapor.

Most insulations blot up the drops of condensed moisture and become soggy—losing their insulating efficiency. But, Dry-Zero is naturally water repellent (non-hygroscopic). It sheds these drops of moisture and never loses its heat-stopping efficiency.

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Dry-Zero has other valuable qualities. It has a "k" factor of 0.24, weighs only 1/7 as much as cork, and will not rot, pack, or absorb odors. In the new Bound-Batt form it is inexpensive and easy to install. Dry-Zero Corporation, 222 N. Bank Drive, Chicago; or 60 E. 42nd Street, New York.

DRY-ZERO • • •
SHEDS WATER LIKE A DUCK

DRY·ZERO INSULATION

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Fairmont Creamery Co. Omaha, Neb.	Omaha, Crete, Grand Island, Neb.; Sioux City, Iowa; Cleveland, Columbus, Ohio; Buffalo, N.Y., New Haven, Conn.; Guthrie, Okla.; Dodge City, Kan. (cold storage houses)	Fairmonts	All kinds of fruits and vegetables, strawberries, raspberries, peaches, rhubarb, poultry. (Fairmont distributes a much larger volume than it packs.)	All styles	Sharp freezer, air blast, Finnegan	15,350,000 (15,000,000 was poultry)	10,000,000 (Seven months)	.....
Marion T. Fannaly, Inc. Ponchatoula, La.	Ponchatoula	Fannaly's	Strawberries, blackberries, figs, shrimp, soft shell crabs, frogs' legs	Cartons, cans, barrels	Sharp freezer, air blast, Birds Eye	3,250,000	3,000,000	.....
Farm Bureau Fru t Products Co. Lansing, Mich.	Muskegon, Benton Harbor, Mich.	Honest George	Strawberries, cherries, berries	Packages (1 lb.); tins (15, 30, 50 lb.); barrels	Sharp freezer	75,000	300,000	1,500,000
Farmers Cooperative Union, Inc. 1104 13th St. S.E., Puyallup, Wash.	Pacific Refrigerating Co.	None	Strawberries, boysenberries, loganberries, blackberries, olympic berries, sour cherries, sweet cherries, raspberries	Mostly barrels, parafined (50-gal.); also tins (30 lb.); cartons (30 lb.)	.....	1,293,519	2,531,601	3,375,000
A. N. Faulkner & Co. Tilgham, Md.	.....	.....	Strawberries	Cans (30 lb.); barrels (50 gal.)	.....	Small	Small	Small
Chas. Feller. Marshfield, Ore.	Marshfield, Coos Bay, Ore.	Chas. Feller	Fish and fish products: halibut, salmon, etc.	Wood boxes; some fiber cartons for shad roe, etc.	Sharp freezers	300,000	250,000	.....
Florence Fish & Oyster Co. Florence, S. C.	Florence, S. C.	None	Fish and other seafoods	Wood boxes	Freezer, zero to 5 deg.	800,000	1,000,000	1,000,000 or more
Food Associates, Inc. Lowman Bldg., Seattle, Wash. 210 California St., San Francisco, Calif. (Sales agent, does not pack)	San Francisco, Calif.; Seattle, Chehalis, Marysville, Wash.	Frostcraft, Tastefull, Kwikway	Strawberries, peaches, raspberries, loganberries, youngberries, blackberries, boysenberries, olympic berries, prunes, apples, apricots, gooseberries, rhubarb, figs, fruit puree, artichokes, asparagus, green beans, lima beans, cauliflower, brussels sprouts, spinach, peas, cut corn, cob corn, broccoli, peas and carrots	.....	.....	.....	.....	.....
Fraser Valley Growers, Ltd. Mission City, B.C., Canada	.....	.....	Black and red currants, blackberries, loganberries, strawberries, raspberries, plums	.....	.....	.....	.....	.....
Fresh Frozen Fruits, Inc. 516 Seaton St., Los Angeles, Calif.	.....	.....	Youngberries, boysenberries (Distributes full line of frozen foods)	.....	.....	.....	.....	.....
Frigid Food Products 1599 E. Warren Ave., Detroit, Mich.	Michigan, Ohio, Missouri	Frigid	All fruits and vegetables	10, 12 oz.; 2½, 5, 10, 15, 30 lb. packages	Sharp freezer and air blast, 25 to 30 deg. below zero	8,500,000	.....	.....
Frostcraft Packing Corp. 185 Lombard St., San Francisco, Calif.	San Francisco, Calif.	Frostcraft	Hearts of artichokes, spinach, asparagus, stringless beans, black mission figs, crushed nectarines, peas, lima beans, cauliflower, broccoli, brussels sprouts	Two piece waxed carton, cellulose wrapped (12 oz. 2½, 5 lb.)	Sharp freezer with air blast, zero to 50 deg. below	650,000	1,250,000	1,500,000
Frosted Foods Sales Corp. 250 Park Ave., New York, N.Y.	Corinna, Me.; Houlton, Me.; Boston, Mass.; Medina, N.Y.; Mount Morris, N.Y.; Albion, N.Y.; Fulton, N.Y.; Riverhead, L.I.; West Sayville, L.I.; Bridgeton, N.J.; Ponchatoula, La.; Indianapolis, Ind.; Fort Wayne, Ind.; Marion, Ind.; Omaha, Neb.; Hillsboro, Ore.; Woodburn, Ore.; Fairmont, Minn.; Halifax, N.S.; Newfoundland	Birds Eye Frosted Foods, Coldseal Frosted Foods	Vegetables: Asparagus tips, asparagus cuts, broccoli, brussels sprouts, cauliflower, corn on cob, cut corn, green beans, wax beans, lima beans, peas, peas and carrots, spinach, squash. Fruits and berries: Blueberries, peaches, raspberries, rhubarb, strawberries, youngberries. Fish: Fillets of cod, haddock, halibut, mackerel, red perch and sole; steaks of halibut, salmon and swordfish. Shellfish: Lobster meat, oysters, scallops, green unpeeled shrimp. Poultry: Squab broilers, broilers, country style fryers, roasting chickens, fowl for fricassee, turkeys. Beef steaks: Sirloin, tenderloin steak fillets, rump steak, chopped steak, supper steak. Beef roasts: Chuck, pot, rib, face rump, sirloin, beef for stew. Lamb Chops: Loin, ribs. Lamb roasts: Leg, forequarter, lamb for stew. Pork: Chops, loin roasts, sausage links. Calves liver.	Cartons: fruits, berries (10, 11, 14, 16 oz.); vegetables (10, 12, 13, 14, 16 oz.); fish (5 lb.); shellfish (10, 12 oz.); poultry (12 oz. to 9 lb. or more); meat (½ to 6 lb.)	General Foods multi-plate freezer	125,000,000 (Not official)	156,000,000 (Not official)	195,000,000 (Not official)
Frosted Fruit Products, Inc. 200 Center St., Los Angeles, Calif.	Los Angeles, Calif.	Chilled-Ripe	Apricots, plums, peaches, pears, tangerines, guavas, pomegranates, nectarines, red raspberries, black raspberries, boysenberries, youngberries, blackberries, strawberries, feijods	Tin cans, vacuum sealed (1 gal.); tin cans (33 lb.)	Air blast, 30 deg. below zero	360,000	850,000	1,250,000
Frozen Fruit Co. 419 S. 12th St., Mart Bldg., St. Louis, Mo. (Jobbers; a cooperative assoc.)	None	Frost-T Fruit	All kinds of fruits, fruit juices, vegetables, fish, fowl. (Frozen by our cooperative members for our account.)	12 oz.; 1, 2½, 5, 10, 15, 30 lb.; 50 gal. barrels	Various	150,000	200,000	250,000
Fruit Belt Preserving Co. East Williamson, N.Y.	East Williamson, N.Y.	Sea King	Cherries	Tins (10, 15, 30 lb.)	Sharp freezer	225,000	298,000	330,000
General Fish Corp. Box 262, Santa Cruz, Calif.	Santa Cruz, Calif.	CruZmar	All types of fish caught in local waters, such as salmon, red snapper fillet, sardines, grayfish fillet	Cartons (5 lb.); whole fish, headless and cleaned, wrapped in kraft paper	Air blast	.....	325,000	.....

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FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Containers	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
General Seafoods Corp. 1–15 Fish Pier, Boston, Mass.	Boston, Mass.	Seafresh; 40 Fathom	Fillets: Haddock, perch, skinless (cod), sole (flounder), sole (genuine), catfish (ocean), silvering, mackerel, pollock, hake, halibut, salmon. Steaks: Swordfish, halibut, salmon, cod. Pan dressed: Perch (ocean), haddock. Shellfish: Scallops, clams, lobster meat, crabmeat, oysters, shrimp	Fish wrapped in transparent cellulose and put into 1, 5, 10 lb. waxed cartons; cartons are wrapped in waxed paper. Vegetables parchment wrapper used also for fish and fillets	Birds Eye		Output included in that of Frosted Foods Sales Corp.	
Genoa Fisheries, Inc. 250 Northern Ave., Boston, Mass.	Commonwealth Ice & Cold Storage	Genoa	Fillets (skin on and skinless): Haddock, cod, hake, pollock, cusk, flounder, lemonsole, graysole, red perch, catfish whiting. Round fish: Sardines, whiting, white bone squid, sand eels, skates wings, monkey fish, porgies, tuna fish, eels, smelts, mackerel, butterfish, white bait, shrimp, Spanish mackerel, etc.	Wood boxes (5, 10, 15 lb.); fillets wrapped in parchment paper and transparent cellulose	Sharp freezer; air blast	1,300,000	1,750,000	2,000,000
P. T. George & Co. P.O. Box 386, Indianapolis, Ind.	Indianapolis, Ind.	Crest	Steaks (in two qualities packed by ounce variations), lamb chops, pork chops, diced stew of beef and lamb, chopped beef in patty form, specialty items such as cubed steaks, sandwich beef and pork	Cartons (5 lb. average). Transparent-cellulose wrappers	Birds Eye	130,000	350,000	1,000,000
Gorton-Pew Fisheries Co., Ltd. Gloucester, Mass.	Gloucester, Mass.	Gorton's	Haddock, cod, hake, flounders, sole, redfish, pollock, mackerel, whiting, scallops, oysters, clams	Wood boxes (parchment lined), waxed lithographed cartons, paper cups, fillets in transparent cellulose and vegetable parchment wrappers	Contact, at 28 deg. below zero	10,000,000		15,000,000
Gould Fruit Products 480 Lake Ave., Rochester, N. Y.	Rochester, N.Y.		Apples, cherries, raspberries, prunes, rhubarb, strawberries, blueberries	Cans (10, 15, 30 lb.)	Sharp freezer	About 400,000 a year		
Gresham Berry Growers. Gresham, Ore.	Gresham, Ore.	Gresham, Flav-R-Pac	Strawberries, red and black raspberries, loganberries, youngberries, boysenberries, blackberries, peaches	10 oz. package to 50 gal. barrel	Air blast and coils, 15 deg. below zero to 5 deg. above	6,734,799	8,934,485	About same as 1940
Gulf Food Products Co. 525 St. Louis St., New Orleans, La.	New Orleans, La.	Sun Brand	Shrimp	Cartons (5 lb.)	Sharp freezer, 30 to 40 deg. below zero	500,000	600,000	1,000,000
John T. Handy Co., Inc. Crisfield, Md.	Crisfield, Md.	Handy	Soft-shell crabs	Wrapped separately in waxed paper, packed 24 to box	Sharp freezer	1,800 doz.	2,000 doz.	2,500 doz.
Harvey & Co., Ltd. St. John's, Newfoundland	St. John's; Floating factory ship "Sunset Glow"; Rose Blanche	Kiltie, Cutlass, Terra Nova, I-C-Kold, Birds Eye, Munn	Fish, all varieties; blueberries	Cases (50, 100 lb.), containers (1, 5, 14, 15, 30 lb.); wood, waxed cardboard, Cryo-Vac	Indirect immersion, Birds Eye, air blast, 30 deg. below zero			
Haserot Co. 521 Woodland Ave., Cleveland, Ohio. (Sales factors for Northport (Mich.) Cherry Factory, Gypsum Canning Co., Port Clinton, Ohio)	Northport, Mich.; Cleveland, Ohio	Northport, Ottawa Chief	Pitted tart cherries	Cans (15, 30, 50 lb.); barrels (450 lb.)	Sharp freezer, 10 deg. below zero	600,000	1,100,000	
Heeney Frosted Foods 78 Bank St., Ottawa, Ont., Canada		Zer-O-Pak	Strawberries, raspberries, blueberries, cherries (sweet), peaches, asparagus, peas, beans (wax, green), spinach, corn on cob, corn off cob, broccoli, cauliflower,	Flat (12, 40 oz.), waxed tubs (16 oz.), tubs (½ gal.), pails (26 lb.)	Sharp freezer	300,000	417,574	600,000
Henderson Bros., Inc. Monticello, Ga.	Monticello, Ga.		Peaches, squab	Paraffin lined barrels (250 lb.); lacquer lined tins (10, 30 lb.); pasteboard cups (1 lb.); pasteboard cartons	Sharp freezer, 40 deg. below zero			
Henry & Close, Inc. Fish Pier, Boston, Mass.	Boston, Mass.	8 Bells, Land Ho, Iceberg, Igloo	Haddock, cod, sea perch, flounder, sole, mackerel, scallops, clams, shrimp	Transparent-cellulose wrapped fillets in 1, 5 lb. units; parchment wrapped fillets in 10, 15 lb. boxes	Birds Eye and sharp freezer	3,000,000	3,500,000	
Hershey Packing Co. University Bank Bldg., Seattle, Wash.			Asparagus, corn, corn on cob, spinach, green beans, lima beans, apricots, berries, peaches					
Carl N. Hewitt. Summit, Calif.	Cedar Springs		Strawberries, corn, vegetable juices	Paper cups (1 lb.), tins (1 gal.; 25, 30, 45 lb.)	Air blast, 10 deg. below zero	20,000	25,000	40,000
Hewlett Bros. Co. 744 So. State St., Salt Lake City, Utah	Salt Lake City, Utah	Hewlett's	Strawberries, raspberries, blackberries, grapes, plums	Barrels (50 gal.)	Cold storage plant, 10 to 12 deg.	320,000	320,000	320,000
Holley Canning Co., Inc. Holley, N.Y.	Brockport, Morton, N.Y.	Holley	RSP cherries, apples	Enameled tin cans (10, 15, 30, 50 lb.)	Sharp freezer, 20 deg below zero	1,600,000	1,400,000	1,600,000
Honor Brand Frosted Foods Corp. 5601 E. 14th St., Oakland, Calif. (Subsidiary of Stokely Bros. & Co., Indianapolis, Ind.)	Santa Cruz, Calif; Kent, Wash.; Mercedes, Tex.; Indianapolis, Ind.; Dover, Del. (The last three plants are owned by Stokely Bros. & Co. The first two by Santa Cruz Fruit Packing Co., a subsidiary)	Honor Brand	Strawberries, raspberries, peaches, blueberries, cherries, asparagus, corn, green beans, lima beans, wax beans, peas, broccoli, spinach, squash, brussels sprouts, cauliflower. (Sells, but does not pack, meat, fish, poultry)	Waxed paperboard cartons, lined with transparent cellulose (10, 11, 12, 14 oz.; 2, 2½, 5, 10 lb.); tins (30 lb.)	Air blast	About 10,000,000		

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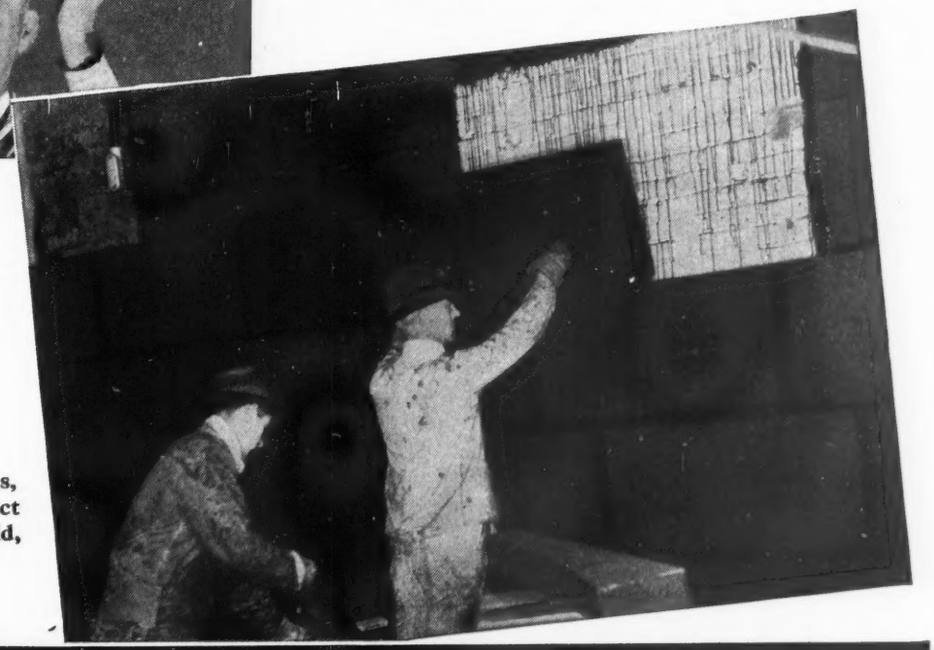

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FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
House of David Cold Storage, Benton Harbor, Mich.	Benton Harbor, Mich.	House of David and private brands	Strawberries, cherries, red raspberries, black raspberries, dewberries, blackberries, gooseberries, boysenberries, grapes, peaches, cauliflower, spinach, mustard greens, corn on cob, string beans	Cartons (20 lb.), cans (10, 30 lb.), barrels (300, 400 lb.)	Sharp freezer and air plant, zero to 20 deg. below	1,958,058	4,861,860	.....
Hubbell Squab Co., 550 University Ave., Los Gatos, Calif.	Los Gatos, Calif.	Dr. Hubbell's	Squab (whole, drawn, boned)	Whole squab wrapped in parchment paper. Drawn and boned packed in pint wax paperboard containers	Circulating salt brine at zero	16,000	12,000	20,000
Hudson-Duncan & Co., Portland, Ore.	Gresham, Portland, Dundee, Ore.	Pride of Oregon	Strawberries, raspberries (red and black), youngberries, boysenberries, loganberries, blackberries	Tins (15, 30 lb.); barrels	18 deg. below zero.	.....	.....	.....
Hudson River Fruit Exchange, Inc., Milton, N. Y.	Milton, N. Y.	Hudsonia	Red currants, cherries, raspberries, grape pulp, grape juice, quince juice, crabapple juice	Barrels (50 gal.)	Quick freezer and sharp freezer	3,800,000	3,500,000	4,000,000
Hudson's Bay Co., Frosted Foods Division, Toronto, Ont., Canada	Halifax, N. S.; Ste. Martine, P. Q.; Simcoe, Ont.	Birds Eye	Asparagus, wax beans, broccoli, brussels sprouts, cauliflower, corn on cob, cut corn, peas, peas and carrots, spinach, squash, lima beans, blueberries, peaches, raspberries, rhubarb, strawberries, cod fillets, haddock fillets, halibut fillets, mackerel fillets, flounder fillets, halibut steaks, salmon steaks, lobster meat, scallops, shrimp, oysters	Cardboard carton, transparent-cellulose lined, greaseproof wrapper (10 to 16 oz.; 40 oz.)	Birds Eye	.....	.....	.....
Humboldt Canning Co., Humboldt, Tenn.	St. Louis and Louisville	.....	Strawberries	Tins, barrels, cartons	.....	.....	.....	.....
Jerpe Commission Co., Inc., Omaha, Neb.	Omaha, Neb.	Diamond "J"	Poultry, turkeys	Various	Birds Eye, and sharp freezer	16,000,000	24,000,000	Increase 15 per-cent
C. S. Kale Canning Co., Everson, Wash.	Bellingham, Wash.	Selkirk	Raspberries	Tins (15, 30 lb.); barrels (50 gal.)	.....	158,750	225,000	300,000
Kelley, Farquhar & Co., Port of Tacoma, Tacoma, Wash.	Salem, Scenic, Banks, Ore.; Tacoma, Wash.	Sparklets, Frost Queen	Strawberries, raspberries, youngberries, boysenberries, blackberries, loganberries, cherries, peaches, apricots, prunes, asparagus, spinach, peas, beans, cut corn, corn on the cob, cauliflower, broccoli	Barrels, tins; cartons and cups with waxed liner and wrap	Sharp freezer and air blast	8,300,000	12,000,000	10,000,000
Keystone Cooperative Grape Association, 63 Wall St., North East, Pa.	North East, Pa.	Keystone	Strawberries, RSP cherries, red raspberries, black raspberries, grapes	Slip-cover tins (15, 30 lb.), barrels	.....	.....	.....	.....
Kingan & Co., Indianapolis, Ind.	Indianapolis, Ind.	Kingans Fresh Frosted Tasti-Foods	Meats (pork, beef)	Cartons (1, 2 lb.); boxes (5, 10, 30, 50 lb.)	Birds Eye	2,000,000	.....	.....
Kruse's, Inc., 2253 Germantown Ave., Philadelphia, Pa.	Philadelphia, Pa.; Norfolk, Va.; Plant City, Fla.; Nashville, Tenn.	Kruse's, also other brands if required	Strawberries, peaches, red raspberries, black raspberries, pureed raspberries, blackberries	Cans (30, 50 lb.); barrels; kegs	Sharp freezer	5,500,000	5,500,000	6,000,000
Kuhner Packing Co., Muncie, Ind.	Muncie, Ind.	.....	Meats	Regular meat packages	Frick freezing equipment	.....	.....	.....
Kuluz Bros. Packing Co., Inc., Biloxi, Miss.	Commercial freezers in Biloxi, Ocean Springs	KonisuR	Shrimp, headless	Cartons (5 lb.)	.....	100,000	220,000	350,000
Roy E. Lathrop, R 2, Box 255, Grants Pass, Ore.	Grants Pass	Sunnybrook Berry & Hop Yards	Blackberries	Barrels, fir, paraffined (50 gal.)	Sharp freezer	202,050	235,350	None
Lawtons Canning Co., Lawtons, N. Y.	Buffalo, N. Y.	Lawtons	Strawberries, red raspberries, black raspberries	Tins (30, 50 lb.), barrels	.....	100,000	150,000	150,000
Little America Finer Frosted Foods Co. (M. Peigenbaum & Sons) 2026 Jenkins Arcade Bldg., Pittsburgh, Pa.	Washington, Oregon, California, Massachusetts, Nebraska	Little America	All items (fruits, vegetables, fish, poultry) except meats	From 8 oz. packages to barrels	Air blast, Finnegan	12,000,000	13,750,000	17,000,000
Lockeport Co., Ltd., Lockeport, N. S., Canada	Lockeport, N. S.	Seacap, Dory, Beacon	Fish	Boxes (10, 15 lb.); cartons (5 lb.)	Air blast, 10 to 30 deg. below zero	13,000,000	15,000,000	18,000,000
A. & R. Loggie Co., Ltd., Loggieville, N. B.	Loggieville, Richibucto, Tracadie, Inkerman, Dalhousie, Shippegan, N. B.; Mulgrave, N. S.	Eagle	Blueberries, cod, haddock, mackerel, smelts, salmon, herring, swordfish, shad, haddock fillets, cod fillets, haddies, smoked fillets	Waxed-paper and parchment lined wooden boxes (15, 30); also 10, 25, 50, 100, 200 lb. boxes. Fillets, mackerel, salmon individually wrapped	Sharp freezers, zero to 20 deg. below	5,500,000 (Fish, 4,500,000)	4,790,000 (Fish, 3,900,000)	6,000,000 (Fish, 5,000,000)
W. S. Loggie Co., Ltd., Chatham, N. B., Canada	Chatham, Tracadie, Shippegan, Logiecroft, N. B.	No name	Blueberries, fish	Blueberries: 15, 30 lb. boxes, parchment liners; fish: different sizes	Ice and salt	30,000	About 70,000	83,000
Lone Star Fish & Oyster Co., P.O. Box 537, Corpus Christi, Tex.	Corpus Christi, Tex.	Lone Star	Shrimp	Cartons (5, 10 lb.)	Just low temperature	.....	100,000	.....
Long Island Cauliflower Assn., 139 Marcy Ave., Riverhead, L. I., N. Y.	Riverhead, L. I.	.....	Cauliflower	1, 2 lb.	"Z" system	Small quantities	.....	.....

Long Island Duck Packing Corp.	Eastport, L. I. (ready-to-cook products) Riverhead, L. I. (regular quick frozen)	Birds Eye, F.C.H., Sunnyfield, Little America, Clover Bloom, Sugardale	Long Island ducks; oysters	Wood boxes	Birds Eye, "Z" and own	.....	.....	5,000,000
R. J. MacLaughlin & Co., P. O. Box 7, Puyallup, Wash.	Salem, Beaverton, Gresham, Ore.; Puyallup, Wash.	None	Strawberries, raspberries, cherries, loganberries, youngberries, black raspberries, gooseberries, boysenberries, blackberries	Cups (1 lb.); cartons (12 oz., 2½, 5 lb.); tins (10, 15, 30 lb.); barrels (30, 50 gal.)	Sharp freezer	3,500,000	4,390,000	4,000,000
B. E. Maling, Inc., Hillsboro, Ore.	Hillsboro, Ore.	.....	Apricots, peaches, prunes, rhubarb, strawberries, asparagus, broccoli, brussels sprouts, cauliflower, corn, squash, peas, green beans, wax beans, lima beans, peas and carrots, spinach, crabmeat and salmon	Consumer and institutional packages, barrels	Birds Eye	Output included in that of Frosted Foods Sales Corp.		
Manitoba Cold Storage Co., Ltd., Higgins Ave. and Argyle Sts., Winnipeg, Man., Canada	Winnipeg, Man., Canada	.....	Fish and other commodities	Boxes and cartons	Series of large cabinets with shelf coils	Large volume	(200,000 lb. per day capacity)	
Maple Ridge Cooperative Produce Exchange	New Westminster, B. C.	Maple Ridge	Strawberries, raspberries, blackberries	Barrels, fir (350 lb. net); tins (5, 15, 30 lb.); carton (1 lb.)	Sharp freezer	50,000	88,500	
Haney, B. C., Canada				One bird to a box	Sharp freezer 25 deg. below zero	218,750	240,625	251,600
Maplecrest Turkey Farms, Inc., Wellman, Iowa	Wellman, Iowa	Maplecrest	Turkeys	Cartons (5 lb.), wooden boxes (5, 10, 15 lb.) Transparent-cellulose and parchment wrapped)	Sharp freezer; also Birds Eye	8,202,922	9,777,639	6,855,070 (6 months)
Maritime-National Fish Ltd., Halifax, N.S., Canada	Halifax, N. S.; St. John, N. B.	Sea Seald, Maritime, Golden Ray, National, Sweet Brier, Sunrise, Bluenose	Haddock, codfish fillets; herring, mackerel, soles, salmon, pollock, scallops, halibut, ocean perch					
The Marlyn Fish Co., Inc., Box 358, Ketchikan, Alaska	Ketchikan, Petersburg, Juneau, Sitka, Alaska	Marlyn	Halibut, salmon, sablefish	Wooden boxes (100 to 500 lb.)	Air blast	About 3,000,000 a year		
Martin Orchards, Inc., Sturgeon Bay, Wis.	.....	Packed mostly on order	Cherries and some strawberries	Tins (10, 15, 30, 50 lb.); half barrels; barrels (50 gal.)	Custom freezer	1,250,000	1,755,000	
Mavar Shrimp & Oyster Co., Ltd., Biloxi, Miss.	Biloxi, Ocean Springs, Bay St. Louis, Miss.; Mobile, Ala.; New Orleans, La. (Commercial freezers)	Silvercrest	Fresh, green, headless shrimp	5 lb. packages	Sharp freezer, 30 deg. below zero	300,000	500,000	1,000,000
William E. McIntosh, Ave. E., Geneva, N.Y.	Geneva, Newfane, N. Y.	McIntosh, Green-Top	Rhubarb, strawberries, raspberries, cherries, peaches, apples	Barrels; tins (30 lb.); cups (1 lb.)	Freezing at zero			
R. M. Mesler, Gasport, N.Y.	Buffalo	Best Par	Strawberries, raspberries, cherries, grape pulp, cherry juice, stemmed grapes, (In 1941 will pack grapes, quince, crabapples juices)	Lacquered tin cans (30, 50 lb.); paraffined barrels	Sharp freezer, zero	2,000,000	1,500,000	3,500,000

WARNSMAN REFRIGERATOR BODIES

NO MATTER

WHETHER your transportation problems are Frosted Foods, Meats, Ice Cream or other perishable foods—

WHETHER they are retail, wholesale or long distance transport—

WHETHER you need one truck or a fleet—
Let our engineers help you solve them.

Our 20 years of experience in manufacturing WARNSMAN REFRIGERATOR BODIES is your assurance of our ability to help you solve them economically and scientifically.

Since 1902, yes, for 38 years WARNSMAN WAGONS AND TRUCK BODIES have been a Standard Value, because they have always been built up to a standard, not down to a price.

REMEMBER!

WARNSMAN BODIES ARE—
MODERN IN DESIGN
EFFICIENT IN OPERATION
REASONABLE IN COST

INVESTIGATE BEFORE YOU BUY. Write, wire or call for complete information.

THE WARNSMAN-FORTNEY BODY CO.

4415 Train Avenue **Cleveland, Ohio**

Transport Refrigeration Engineers

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Metcalfe Foods, Ltd. Whitby, Ont., Canada	.....	.....	Asparagus, beans, corn, peas, raspberries, strawberries, loganberries, fruit	.....	.....	3,000,000	4,629,600	.....
Missouri State Chickeries, Inc. (Operating as Botz Chickeries) Myrtle Ave., Jefferson City, Mo.	Jefferson City, Mo.....	Botz Poussinette, Botz Poulette	Poultry, fully eviscerated battery raised broilers, everything quick frozen, including livers and giblets packed separately	Corrugated cartons and waxed tubs (1, 2, 5 lb.)	Botz patent (exclusive users)	250,000	300,000	500,000
S. A. Moffett Co. 1331 Western Ave., Seattle, Wash.	Seattle, Stanwood, Mt. Vernon, Sunnyside, Yelm, Wash.	Polar, Eskimo, Samco, Valley	Apricots, blackberries, currants, cherries (RSP), cherries (black, pitted), black raspberries, red raspberries, strawberries, huckleberries, boysenberries, loganberries, gooseberries, youngberries, olympic berries, peaches, prunes, wild blackberries, purees, asparagus tips, asparagus cuts, green beans (cut and whole), cut corn, ear corn, spinach, peas, peas and carrots, lima beans, broccoli, brussels sprouts, cauliflower, squash, carrots	Retail sizes, 10 oz. to 1 lb.; also, 2½, 5, 10, 15, 25, 30 lb.; barrels	Sharp freezer, 40 deg. below zero; air blast, 35 below	20,000,000	28,000,000	36,000,000
Monmouth Beach Cold Storage Co., Inc. Monmouth Beach, N.J.	Monmouth Beach, N.J...	Polar.....	Fish: whiting, croakers, butterfish, porgies, squid, herring, mackerel, bonito, weakfish	Wooden boxes.....	Sharp freezer.....	2,000,000	2,000,000	2,000,000
Monmouth Canning Co. 256 Commercial St., Portland, Me.	Portland, Me.....	Monmouth.....	Blueberries (graded for size).....	Tins (15, 30 lb.).....	Air blast, 10 deg. below zero	85,000	235,000	250,000
John C. Morgan Co. Traverse City, Mich.	Traverse City, Muskegon, Grand Rapids, Mich.; Chicago, Ill. (We do not own freezing plants)	Morgan.....	RSP cherries.....	Tins (30 lb.); wood barrels (425 lb. net)	Sharp freezer.....	90,000	720,000	.....
Morton Canning Co., Inc. Morton, N.Y.	Morton, N.Y., Brockport, N.Y.	Morton.....	RSP cherries, peaches.....	Tins (10, 15, 30, 50 lb.); barrels (450 lb.)	Sharp freezer, 15 deg. below zero	945,083	888,193	1,200,000
Mukai & Son. Vashon, Wash.	Vashon, Wash.....	Rock Garden.....	Strawberries, loganberries, red currants, black currants, gooseberries, red sour cherries	Tins (30 lb., also smaller); barrels, paraffine lined (50 gal.)	Sharp freezer.....	1,000,000	1,390,393	.....
W. A. Munn & Co., Ltd. St. John's, Newfoundland	St. John's Newfoundland.	Munn's.....	Blueberries.....	Boxes (30 lb.).....	Sharp freezer.....	.....	.....	.....
Mutual Citrus Products Co., Inc. 424 S. Atchison St., Anaheim, Calif.	Anaheim, Calif.....	MCP.....	Orange and lemon juices (Packs frozen juices only on order and ships in carload quantities to large distributors and manufacturers, who either use or resell under their own brands)	Cans (30 oz.; 1 and 6 gal.)...	.....	.....	.....	.....
National Chip Steak Co. Bryant Bldg., Kansas City, Mo.	Philadelphia; Los Angeles; San Francisco; Portland, Ore.; Seattle; Buhl, Idaho; Salt Lake City; Dallas, Tex.; Phoenix, Ariz.; Kansas City, Mo.; Chicago; Cleveland; Newark, N. J.; Buffalo, New York	Chip Steaks.....	Fresh beef (rounds and loins).....	Dry wax paper and carton (2 lb.). Cardboard container, liner only in separate shipping box	Sharp freezer, 10 deg. below zero	1,000,000	2,000,000	3,000,000
National Frosted Foods, Inc. 110 Cliff St., New York, N.Y. (Does not pack but contracts for production under own system and control)	One in New York, three in Japan, two in Iceland, two in India	National Frosted, Ocean Pack	Fillets of cod, haddock, hake, swordfish steaks, scallops, salmon, halibut and other seafoods	Fillets are wrapped individually in moistureproof transparent-cellulose, with waxed telescope cartons (1, 5 lb.)	"Z" Process, Flexible Froster	300,000	350,000	1,500,000
National Fruit Canning Co. 1720 West Spokane St., Seattle Wash.	Chehalis, Wash.....	Valamont, Tastefull	Strawberries, raspberries, currants, blackberries, boysenberries, loganberries, youngberries, apricots, peaches, apples, peas, corn, beans	Cartons (12 oz.; 1, 2½, 5, 10 lb.); cups (1 lb.); cans (5, 10, 15, 30 lb.); barrels (50 gal.)	Finnegan.....	2,750,000	2,550,000	3,000,000
National Fish Co., Ltd. Halifax, N.S., Canada	Halifax, N.S.....	.....	All kinds of fish produced in its waters, such as haddock, cod, hake, pollock, soles, herring, mackerel, salmon, swordfish, smelts, flounders, skatewings, cod tongues, cod roe, scallops, large quantities of fillets of haddock and cod	All kinds, from individual waxed parchment and transparent-cellulose wrapper to cartons and wooden boxes	Own.....	About 7,000,000 annually		
New England Fillet Co., Inc. 26 Boston Fish Pier, Boston, Mass.	Boston, Mass.....	Seacrest.....	Scallops, mackerel, butterfish, all varieties of fillets	1, 5, 10, 15 lb. units.....	Birds Eye and air blast	300,000	390,000	500,000
New England Fish Co. Spokane St. Terminal, Seattle, Wash.	Kalama, Wash.; Eureka, Calif.; Boston, Mass.; New York, N. Y.; Chicago, Ill.; Ketchikan, Petersburg, Sitka, Juneau, Alaska; Vancouver, Butedale, Prince Rupert, B.C.	Belleanna, Nefco, Columbia	Salmon, halibut and other Pacific Coast fish (dressed, and packaged slices and fillets)	Wooden boxes for whole dressed fish; cartons for slices and fillets	Sharp freezing, 30 to 50 deg. below zero	15,000,000	15,000,000	15,000,000
Chas. Neubert Strawberry Co., Inc. 114 E. York St., Baltimore, Md.	Baltimore, Md.....	.....	Strawberries, peaches, blackberries	Tins (30 lb.); barrels (450 lb.)	.....	More than 1,000,000 a year		

DIAFANE

Made in various special grades for lining cartons of poultry, vegetables and other dry-packed products. It is highly moisture-proof, grease-proof, transparent and available for heat seal if desired. Tested and approved by many leading authorities on frozen food packaging. Costs much less than most transparencies.

WAXED WET-RAP

Particularly adapted to frozen fish. It is a pure sulphite paper combining the moisture-proof qualities of a waxed sheet with the wet strength of a parchment. Moderately priced as well as technically correct. *Plain* Wet-Rap is often used for its wet-strength where no moisture- or grease-proof qualities are needed.

LOCKER PAPER

A comparatively new product specially developed for use in locker plants. It combines an excellent degree of moisture resistance and blood-proofness, at a price that is practical for locker use. Available in sheets or rolls of any size.

LACQUERED PARCHMENT

The only frozen food wrap that combines high moisture resistance, high wet-strength, a positive, permanent heat seal, and low temperature toughness and flexibility. Somewhat expensive for locker use, but its unusual properties have enabled it to solve some of the most difficult problems in frozen food packaging.

4 RIEGEL PAPERS

SPECIALLY MADE FOR THE *Quick-Freezing Industry*

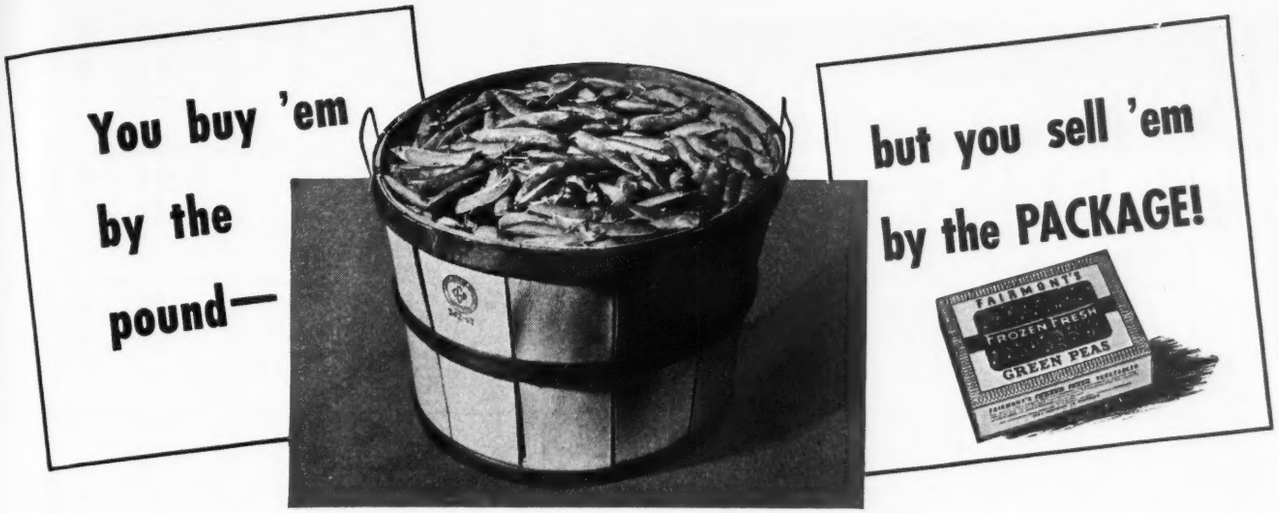
Among over 230 different Riegel Papers are these four lines which we have developed specially for the frozen food industry. We believe that technically correct and reasonably priced packaging papers are of particularly vital importance in this field, and have been constantly working toward that end. The papers we recommend above have had from six months to six years of continuous use in quick freezing, and we believe they should be of definite interest to everyone in this field. Write for samples and prices, but please state the probable intended use so that we may send the particular paper best suited.

RIEGEL PAPER CORPORATION

342 MADISON AVE., NEW YORK, N. Y.

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
L. M. Newcomb & Co., Inc. Old Point Comfort, Va.	.....	Chesapeake Bay...	Fish fillets.....	1, 10 lb.....	.....	.....	.....	.....
Niagara Frosted Foods, Ltd. Hamilton, Ont., Canada	Stoney Creek, Fonthill, Kingston, Ont.	.....	Fruits and vegetables.....	.....	.....	.....	.....	.....
Nickerson Bros., Ltd. Liverpool, N.S., Canada	Liverpool, N.S.....	Mersey, Prime....	Fish.....	Boxes (10, 15, 25, 50, 100, 200 lb.)	Sharp freezer.....	2,200,000	2,500,000	2,500,000
H. B. Nickerson & Sons, Ltd. North Sydney, N.S., Canada	North Sydney, N.S.....	Margaree, Crown, Cream of The Sea, South Bay	Fish, all varieties; meats of all kinds; berries	Wooden boxes lined with parchment (15 lb.)	.....	.....	.....	.....
Herbert A. Nieman & Co. Canneries Division, Thiensville, Wis. (Took over Cedarburg Canneries, Inc., plant)	Thiensville.....	Garden Spot.....	Peas, peas and carrots, corn and beets..	Packages (12 oz.; 2½, 5 lb.); bulk (25 lb.)	Sharp Freezer and air blast	5,000	1,000,000	2,000,000
L. F. Noonan Co., Inc. 2514 Adeline St., Oakland, Calif.	San Jose and Santa Clara, Calif.	Garden Fresh.....	Peas, asparagus, squash, string beans, broccoli, cauliflower, lima beans (will add apricots, peaches and perhaps berries)	Cartons (1, 2½, 5 lb.; wrapped and lined with transparent cellulose); tins and paper cans (2½, 5 lb.)	Cabinet freezer with ammonia coils, temperature of —50 deg. F.	About 2,000,000 a year		
Norfolk Berry Growers Assn. Simcoe, Ont., Canada	Simcoe, Ont.....	.....	Strawberries, raspberries.....	50 gal. barrels, 23 lb. pails; Birds Eye pack, 1, 2½, 10 lb.	Zero sharp freezer and Birds Eye freezer	523,000	804,000	.....
North Pacific Canners and Packers 412 Railway Exchange Bldg., Portland, Ore. (Cooperative sales organization for group of member packers)	Gresham, Stayton, Salem, Springbrook, Ore.; Vancouver, Wenatchee, Wash.	Flav-R-Pac, Gresham, Cedergreen	Strawberries, red raspberries, loganberries, youngberries, black raspberries, peaches, prunes, boysenberries, apricots, blackberries, RSP cherries, black cherries, peas, corn, asparagus, lima beans, green beans, spinach, broccoli, cauliflower	Cartons, transparent-cellulose lined (1, 2½, 5, 10 lb.); tins (10, 15, 30 lb.); barrels (50 gal.)	Sharp freezer, air blast	13,000,000	13,000,000	.....
North Wind Packing Co., Inc. 2200 1st. Ave., Seattle, Wash.	Seattle.....	Northwind.....	Peas, strawberries, cob corn, lima beans, green beans	Open-end carton with transparent-cellulose bag and waxed wrapper (12 oz., 2½, 5 lb.), tins (10, 30 lb.), barrels (50 gal.)	Shaker freezer with air blast, 10 deg. below zero (Frank Knowles-Baker Ice Machine unit)	300,000	600,000	1,200,000
Northwest Packers, Inc. Kent, Wash. (Formerly frozen foods division of F. H. Hogue)	Kent, Wash.....	.....	Asparagus, peas, corn, spinach, beans, broccoli, berries, fruit	Flat cartons, cups, tubs...	Peas, corn, loose frozen	.....	.....	.....
Northwestern Frozen Products, Inc. 208 Columbia St., Seattle, Wash.	Seattle, Wash.....	Kwikway.....	Peas, spinach, corn.....	Sulphite cartons, lined with transparent cellulose (2½, 5, 10 lb.)	Sharp freezer, 20 to 30 deg. below zero	None	100,000	300,000
O'Donnell-Usen Fisheries Corp. Boston, Mass. (Also Mariners Fish. Co., Gloucester, Mass.)	Boston, Gloucester, Mass.	O'Donnell Quality Taste O Sea	Haddock, cod, sole, flounder, sea perch, mackerel, scallops, pollock, whiting	1, 5, 10 lb. cartons; 10, 15 lb. wood boxes	Air blast, 35 deg. below zero; Birds Eye	8,000,000	10,000,000	12,000,000
O'Hara Bros. Company, Inc. 22 Fish Pier, Boston, Mass.	South Boston, Mass.....	.....	Fillets of haddock, pollock, cod, hake, cusk, redfish, sole, flounder, and mackerel	Wooden boxes (10 and 15 lb.)	Frick equipment for quick-freezing; temp. as low as —40 deg. F.	About 25,000,000 lb. fillets, 5,000,000 lb. whiting, mackerel a year		
Olney & Carpenter, Inc. Wolcott, N.Y.	Wolcott, Eden, N.Y.....	O & C Frost Sealed, 999 Frost Sealed	Peas, peas and carrots, green and wax beans, lima beans, corn, spinach, asparagus, cauliflower, broccoli, brussels sprouts, squash, strawberries, cherries, raspberries, rhubarb, blue berries, peaches	10, 12 oz., 2½, 3, 10, 30 lb. containers	O & C.....	.....	.....	.....
O'Loane, Kiely & Co., Ltd. 1058 Hamilton St., Vancouver, B.C., Canada	New Westminster, B.C..	O.K.....	Blackberries, wild blueberries, cultivated blueberries, boysenberries, red currants, black currants, RSP cherries, gooseberries, loganberries, red raspberries, strawberries, asparagus tips, cut green beans, cut wax beans, cut kernel corn, corn on cob, peas, soup stock peas, spinach	Waxed cups (15 oz.), waxed cardboard patent coated, container (2 lb.); corrugated containers, wax paper lined 5, 10, 20 lb.), tins, enameled (15, 25, 30 lb.), barrels, fir, paraffine lined. Vegetables: waxed cardboard patent coated containers (10, 12 oz.; 2½, 5 lb.)	Air blast quick freezing, 25 to 30 deg. below zero	300,000	400,000	400,000
Olympia Canning Co. Columbia & A Sts., Olympia, Wash.	.....	.....	Strawberries, raspberries, loganberries, blackberries	Barrels.....	.....	.....	.....	.....
Oregon Fruit Products Co. Salem, Ore.	Salem.....	Oregon.....	Strawberries, loganberries, raspberries, youngberries, boysenberries, plums, cherries	Barrels, tins (5, 10, 15, 30 lb.), cups (1 lb.)	Sharp freezer, air blast	800,000	1,000,000	1,250,000
Orem Berry Growers, Inc. Provo, Utah	Utah Ice & Cold Storage Co.	.....	Strawberries, raspberries.....	Barrels (50 gal.), cans.....	.....	About 45,000	.....	.....
Pacific Northwest Canning Co. Puyallup, Wash.	Puyallup, Wash., Salem, Ore.	No brand.....	Strawberries, red raspberries, loganberries, boysenberries, blackberries, RSP cherries	Tins, slip cover, enamel lined; barrels, fir, parrafine lined	Sharp freezer, 20 deg. below zero	450,000	350,000	500,000



YOUR quick-frozen foods are going to stand or fall on their packages—as many a packer has found out to his sorrow! Which is why Container Corporation maintains a staff of *frozen foods specialists* to handle all business in this new industry.

These men have literally grown up with quick-freezing, working with the big packers, *learning by doing.* They have made important contributions to carton sizes, packaging procedures, protection in storage and merchandising.

Their experience is now available to present or potential packers of quick-frozen foods. Call them in for consultation. Phone or write the nearest Container Corporation office.

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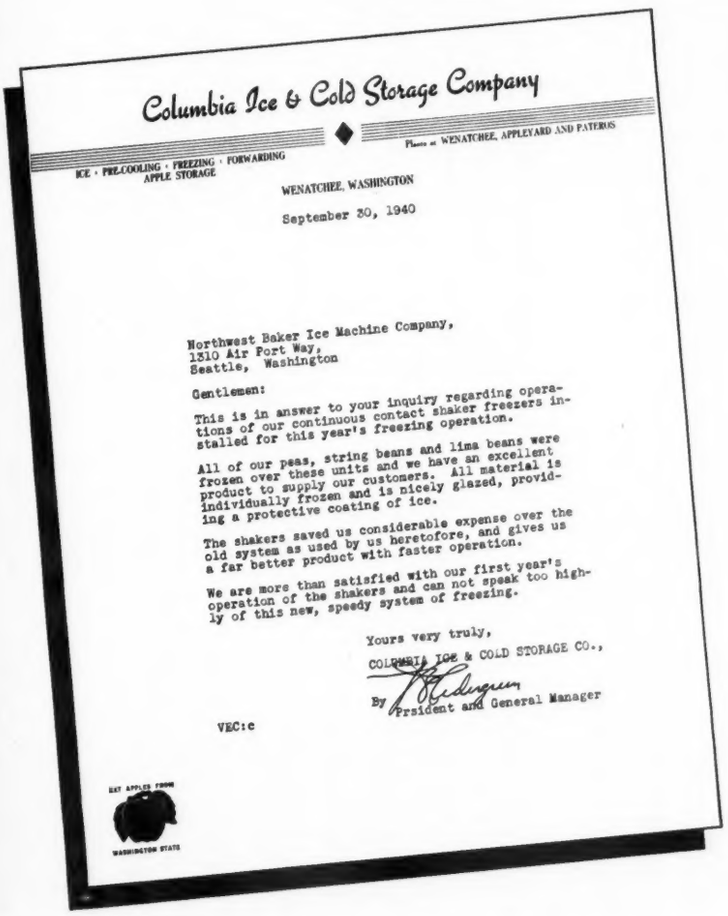

Columbia Ice & Cold Storage Company

ICE • PRE-COOLING • FREEZING • FORWARDING
APPLE STORAGE

Plants at WENATCHEE, APPLEYARD AND PATEROS

WENATCHEE, WASHINGTON

September 30, 1940

Northwest Baker Ice Machine Company,
1210 Air Port Way,
Seattle, Washington

Gentlemen:

This is in answer to your inquiry regarding operations of our continuous contact shaker freezers installed for this year's freezing operation.

All of our peas, string beans and lima beans were frozen over these units and we have an excellent product to supply our customers. All material is individually frozen and is nicely glazed, providing a protective coating of ice.

The shakers saved us considerable expense over the old system as used by us heretofore, and gives us a far better product with faster operation.

We are more than satisfied with our first year's operation of the shakers and can not speak too highly of this new, speedy system of freezing.

Yours very truly,
COLUMBIA ICE & COLD STORAGE CO.,
By [signature]
President and General Manager

VEC:c

EAT APPLES FROM WASHINGTON STATE

2,000,000 Pounds for CEDERGREEN by BAKER

Substantial saving in operating cost

MORE than 2,000,000 pounds of peas, string beans, and lima beans were frozen this season by Cedergreen with BAKER shaker freezers. The letter at left speaks for itself regarding the high quality of the frozen product and the substantial saving in operation over previous equipment. Why not enjoy these same advantages in your plant by installing BAKER equipment? Write now for complete information.

BAKER ICE MACHINE COMPANY, INC.

1562 EVANS ST. - OMAHA, NEBRASKA

Sales and Service in All Principal Cities

AUTHORITY ON MECHANICAL COOLING FOR 35 YEARS

BAKER ENDURING QUALITY

FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Container	System	1939 output (lb.)	1940 output (lb.)	Intended 1941 output (lb.)
Frank Pilley & Sons, Inc. Sioux City, Iowa	Sioux City, Iowa	Pilley's	Poultry (full drawn)	Birds wrapped in transparent cellulose, packed 6 to a box; cut up birds, 1 to a box	Z process	.....	500,000	.....
Plancich Fish Co., Inc. 300 N.W. 13th Ave., Portland, Ore.	Portland, Ore.	.....	Halibut, salmon	Each fish wrapped in paper, packed in boxes (100 lb. or over)	Sharp freezer, 5 or 10 deg. below zero	35,000	60,000	60,000
Pleasant Grove Canning Co. Pleasant Grove, Utah	Packed at Pleasant Grove, frozen at Utah Ice & Cold Storage, Provo	Packed for manufacturing concerns	Strawberries, cherries, raspberries	Cans (10, 30 lb.); barrels (50 gal.)	.....	500,000	500,000	500,000
Pony Brand Essence & Syrup Co., Ltd. Industrielle Ave., Limoilou, Quebec, Que., Canada	City of Quebec	Pony Brand	Strawberries, raspberries, blueberries	Barrels (100, 200, 300, 400 lb.); containers (1, 2 lb.)	Brine, cooled by ammonia	350,000	225,000	350,000
Pratt's Fresh Frozen Foods, Inc. 513 W. 16th St., New York, N.Y.	We freeze at various points. Locations change according to crop conditions for each product	Pratt's and Gem	Vegetables: Asparagus, lima beans, green beans, wax beans, broccoli, brussels sprouts, cauliflower, cut corn, corn on cob, peas, peas and carrots, spinach, squash (cooked), succotash. Fruits: Apricots, blackberries, blueberries, cherries (sour pitted), loganberries, peaches, pineapple, plums, raspberries, rhubarb, strawberries, youngberries. Fish and sea food: Haddock fillets, codfish fillets, ocean perch fillets, halibut steaks, swordfish steaks, sole fillets, mackerel fillets, scallops. Poultry: Broilers, fryers, roasters, fowl; geese; ducks; turkeys. Meats: steaks, roasts, chops, stew meats, chopped steak, etc.	Waxed cartons, transparent-cellulose lined (10, 12, 14, 16, 40 oz.); tins, lithographed, for loose-frozen vegetables (5 lb.); tins (10, 30 lb.) for fruits	Various systems used for various products	.....	.....	.....
Priebe & Sons, Inc. 110 N. Franklin St., Chicago, Ill.	Perry, Iowa	Priebe	Poultry	.....	.....	.....	.....	.....
Producers Cooperative Packing Co. Salem, Ore.	Salem, Ore. (commercial freezer)	.....	Strawberries, gooseberries, loganberries, youngberries, boysenberries, red sour cherries	Barrels	Products frozen at a commercial freezer	.....	125,000	.....
Pure Fruit Juices, Inc. 220 Bagley Ave., Detroit, Mich.	Los Angeles, Calif.	Cold Gold	Orange and lemon juices	Citrus enamel lined tin cans (14, 30, 120 oz.)	Finnegan tubular freezer (sharp freezing with alcohol and water), zero to 10 deg. below	.....	140,000	1,000,000 plus
Quality Col-Pak, Inc. 450 Fernando Court, Glendale, Calif.	Glendale, Calif.	Kol-Pak, Dewkist, Quality	Youngberries, boysenberries, strawberries (individually frozen, limited quantity)-All other frozen fruits, vegetables, seafood are purchased already packed for us by Northwestern packers	Wood boxes, wax lined; Bulkans, wax impregnated; sizes: 5, 10, 20, 25, 40 lb.)	Sharp freezer, 30 deg. below zero	490,000	640,000	850,000
Ray-Maling Co., Inc. Hillsboro, Ore.	Woodburn, Ore.	Birds Eye	Strawberries, youngberries, raspberries, green beans, peas	Consumer and institutional packages; barrels	Birds Eye	Included in that of Frosted Foods Sales Corp.		
The Red Wing Co., Inc. F: donia, N.Y.	Fredonia, N.Y.	.....	Strawberries, raspberries, cherries, currants, grapes (packed for preservers)	Barrels (50 gal.); tins (10, 30 lb.)	Sharp freezer	1,000,000	1,400,000	Approx. same
Reidpath Co. Richibucto, N.B., Canada	Richibucto, N.B.	Diamond	Sea herring, mackerel, shad, cod fish, smelts, flat fish (small flounders), tomcods (sold mainly on Montreal market), eels, blueberries	Boxes (10, 15, 30, 50, 100 lb.); also fancy transparent-cellulose pack (2 lb.)	Sharp freezer, equipped with pans, 20 deg. below zero	200,000	250,000	350,000
Reynolds Preserving Co. Sturgeon Bay, Wis.	Commercial freezers in Milwaukee, Green Bay, Wis.; Chicago, Minneapolis	Cherryland	Cherries (cold pack)	Tins, enamel lined (10, 15, 30, 40, 50 lb.); barrels, fir, parafine lined (50 gal.)	Sharp freezer, 10 deg. below zero	750,000	500,000	1,000,000
Richardson & Holland, Inc. 1001 John St., Seattle, Wash.	Seattle, Wash.	R & H	Strawberries	Tins (30 lb.); barrels, wood	Ammonia system, 10 deg. above zero	259,455	334,258	.....
W. H. Roberts & Co. 1001 S. Lakewood St., Baltimore, Md.	Baltimore, Md.	.....	Strawberries, spinach	.....	.....	.....	.....	.....
Rocky Mountain Packing Corp. Salt Lake City, Utah	Ogden, Utah	Twin Peaks, Snoline, Glenwood	Peas, lima beans, green beans, broccoli, spinach, corn, cauliflower, apricots, peaches, cherries, raspberries, strawberries, cantaloupe balls	Paraffine-coated end-opening cartons, transparent cellose bags, wax wrappers (12 oz.; 2½, 5 lb.); bags (50 lb.)	Air blast, open trays; to 30 deg. below zero	875,000	800,000	1,500,000
Rood & McLean Fruit Products. Westfield, N.Y.	Westfield, N.Y.	.....	Fruits, such as berries and cherries	Barrels (50 gal.); tins (50 lb.)	Cold pack	100,000	75,000	100,000
Salter Canning Co. North Rose, N.Y.	.....	.....	Red sour pitted cherries	Tins (30 lb.); barrels (450 lb.)	Sharp freezer	.....	150,000	.....
San Juan Fishing & Packing Co. Foot of Stacey St., Seattle, Wash.	Seattle, Wash.; Seward, Alaska	San Juan	Halibut, salmon, sablefish	Boxes (100, 200, 330 lb.)	Sharp freezer	5,500,000	5,500,000	5,000,000
Sebastian Stuart Fish Co. Seattle, Wash.	Seattle, Wash.	S & S	All varieties of fish and seafoods	Pillets of sole, cod in waxed cartons (5 lb.), frozen whole fish in wooden boxes	Sharp freezer	.....	.....	.....
Sherman-White Packing Co.	Fort Wayne, Ind.	Birds Eye	Ready-to-cook poultry	Birds wrapped in trans-	Birds Eye	Output included in that of Frosted Foods		

Sebastian Stuart Fish Co. Foot of Stacey St., Seattle, Wash.	Seattle, Wash.	S & S	All varieties of fish and seafoods	Fillets of sole, cod in waxed cartons (5 lb.), frozen whole fish in wooden boxes	Sharp freezer				
Sherman White Packing Co. Fort Wayne, Ind.	Fort Wayne, Ind.	Birds Eye	Ready-to-cook poultry	Birds wrapped in transparent cellulose	Birds Eye	Output included in that of Frosted Foods Sales Corp.			
E. A. Smith & Co. 2323 Orleans St., Baltimore, Md.	Baltimore, Md.		Strawberries, black and red raspberries, blackberries, pineapples and peaches	Cans (10, 15, 30 lb.); barrels.	Sharp freezer	More than 1,000,000 a year			
Snider Packing Corp. 40 Franklin St., Rochester, N.Y.	Houlton, Me.; Albion, Medina, Mt. Morris, Fulton, N. Y.; Marion, Ind.	Birds Eye, Snider	Fruits and vegetables		Birds Eye	Output included in that of Frosted Foods Sales Corp.			
Sodus Canning Co. Box J, Sodus, N.Y.	Sodus, N.Y. (Sodus Cold Storage Co.)		Strawberries, red sour cherries	Tins (15, 30 lb.); barrels.	Air blast	About 250,000 a year			
Sodus Fruit Farm, Inc. Box 73, Sodus, N.Y.	Williamson Storage & Ice Co.; Sodus Cold Storage Co.	Sodus Fruit Farm, Inc.; Also buyers' labels	Mortmorency and English Morello cherries. (Anticipate starting in moderate way with strawberries in 1941)	Tin cans (10, 15, 30, 50 lb.); barrels	Sharp freezer; combination sharp freezer and air blast	1,116,000	1,152,500		800,000 to 1,500,000
South Fraser Farmers' Union New Westminster, B.C., Canada	New Westminster, B.C., Canada	South Fraser	Strawberries and all other varieties of berries, such as raspberries, loganberries, blackberries, red and black currants	Waxed paper cups (1 lb.); tins (15, 30 lb.); barrels (450 lb.)	Sharp freezer		272,250		Same
South Haven Fruit Exchange South Haven, Mich.	South Haven, Mich.		Strawberries	Tins (30 lb.); barrels (450 lb.)					50,000
Southern Frosted Foods, Inc. 715 So. 21st St., Birmingham, Ala.	Birmingham, Ala.	Vita-Froze	Strawberries, peaches	Tubs (10 lb.); cans (30 lb.); products quick frozen individually	Air blast, 5 deg. below zero	400,000	550,000		2,000,000
Southern Packing Co., Inc. Foot of Fell St., Baltimore, Md.	Baltimore	Sodalicious, Value, Merit	Strawberries, peaches, raspberries, pineapples	Tins (30, 50 lb.); barrels (30, 50 gal.)	Commercial sharp				
Spencer Packing Co. 688 Third St., Lebanon, Ore.	Lebanon, Ore.	Spencerian	Strawberries, red raspberries, black raspberries, loganberries, youngberries, boysenberries, prunes	Tins (15 and 30 lb.); barrels (30 and 50 gal.)	Z process	282,600	1,234,000		
Sprague, Warner & Co. P.O. Drawer Z, Chicago, Ill.	Do not freeze, but have products frozen under our brand	Richelieu	Asparagus, green beans, lima beans, broccoli, brussels sprouts, cauliflower, corn on cob, cut corn, peas, spinach, cooked squash, apples, apricots, blackberries, blueberries, boysenberries, black cherries, red sour pitted cherries, loganberries, prune plums, red raspberries, strawberries, youngberries; cod, flounder, halibut, skinless haddock, ocean perch, grey sole, scallops, peeled and cleaned shrimp; split broilers, cut fowl, cut fryers, roasters, turkey	Waxed board, transparent-cellulose lined (10, 12 oz.; 1, 2½, 5, 10 lb.); waxed board (14 oz.); cans, lacquer coated (15 lb.); corrugated board, parchment lined (30 lb.); wood lug boxes, parchment lined	Sharp freezer, air blast, Finnegan				
Springbrook Packing Co. Springbrook, Ore.	Springbrook	None	Strawberries, blackberries, youngberries, boysenberries, RSP cherries, rhubarb	Tins (15, 30 lb.); wooden barrels (50 ga.)	Air blast, 10 deg. below zero	280,370	541,380		700,000

Exact Weight Scales

High speed, EXACT WEIGHT Scale (counter-sunk) in a packaging operation at Frostkraft Packing Corp., San Francisco.

For Frozen Food Packaging . . .

Guesswork carton filling is hazardous . . . invites overweight as well as underweight. For twenty-five years we have successfully demonstrated to food packers that packaging from bulk is best accomplished by sound, predetermined fraction ounce weighing to insure *profits*. Pictured here are fast end-tower EXACT WEIGHT Scales. These models are the most popular packaging scales in the Quick Freeze food industry. They fit most any production line. Other models are available . . . write for details for your plant.

EXACT WEIGHT Model #273 for tree ripened fruits, peas, beans, berries, asparagus, artichokes. Weighs in out-of-level position — Sensitive to ¼ oz. and capacity to 12 lbs.

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The Exact Weight Scale Company
21 W. Fifth Ave., Columbus, Ohio

THERE IS NO SUBSTITUTE FOR EXACT WEIGHT
INDUSTRIAL PRECISION SCALES

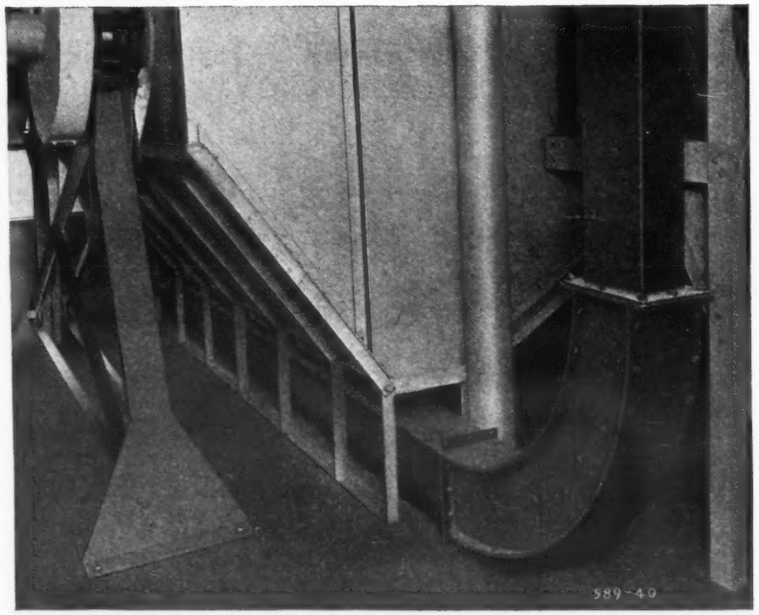
FROZEN FOODS DIRECTORY

Company	Freezing plant location	Brand	Products	Containers	System	1939 output (lb.)	1940 output (lb.)	Intended 1940 output (lb.)
Standard Foods, Inc. 729–731 S. 8th St., Louisville, Ky.	Louisville, Ky.	Redyquik, Standards, private labels	Steaks, barbecued pork, barbecued beef, barbecued mutton, roasted beef, chili con carne, broths	Fiber cans, corrugated boxes, tin cans	Sharp freezer, 5 deg. below zero	300,000	350,000	400,000
Stayton Canning Co. Coop. Stayton, Ore.	Terminal Ice and Cold Storage Co.	Santiam	Strawberries	Tins (30 lb.); barrels fir (50 gal.)	Regular cold pack system	662,000	644,000	650,000
Sunnyside Ice & Produce Co. Sunnyside, Wash.	Sunnyside, Wash.	Polar	Asparagus	12 oz., 2½ lb.	Sharp freezer, air blast at −10 deg.	32,000	150,000	.....
Sunshine Packing Corp. of Pa. 422 Erie Bldg., Cleveland, O.	Cleveland, Ohio; North East, Pa.; Ponchatoula, and Albany, La.	.....	Strawberries, cherries, red raspberries black raspberries, blackberries, red currants, black currants, crushed pineapple, peaches, apricots, elderberries, gooseberries, blueberries, columbian raspberries, grapes, prunes, plums and fruit juices of all kinds	Cans (15, 30 lb.); barrels (450 lb.)	Sharp freezer	14,000,000	16,000,000	.....
Todkill & Chapman North East, Pa.	.....	T & C	Cherries	Containers (10, 15, 30 lb.); barrels (50 gal.). Use lacquered tin cans	Sharp freezer, 20 deg. below zero	1,700,000	1,250,000	.....
Union Trade & Packing Co. Ketchikan, Alaska	Petersburg, Alaska	U. T. P. C.	Salmon	100, 200 lb. wood boxes	Sharp freezer	58,936	119,357	.....
United Frosted Foods, Inc. 110 N. Franklin St., Chicago, Ill. (Distributors, not packers)	No plants	Four Winds	Green beans, lima beans, cut corn, cob corn, asparagus, spinach, broccoli, strawberries, red raspberries, peaches, RSP cherries, boysenberries, blueberries, fillets of cod, haddock, ocean perch, sole; scallops, shrimp; broilers, fryers, roasters, turkeys; chopped steak, lamp chops, pork chops	Consumer size; also 2½, 5 lb. institutional	Air blast	.....	.....	.....
Waldport Sea Food Co., Inc. Box 617, Waldport, Ore.	Waldport	Waldport	Crabmeat	Tins, parchment lined (1, 5 lb.)	Sharp freezer	20,000	30,000	30,000
Walker Fulton Fish Co. 227 N. Union Ave., Chicago, Ill. (Distributor, does not pack)	Frozen by Bodle, California Consumers, Fairmont Canning Co., Maritime Fish Co., Ltd.	Walker's Selected	Vegetables, fruits, berries, fish, poultry	Transparent-cellulose lined packages (10, 12, 16 oz.)	Air blast	340,000	.....	.....
Ward & LeRoy, Inc. Box 5, Sodus, N. Y.	Sodus, N. Y. (Sodus Cold Storage Co.)	.....	Sour cherries	Cartons (1, 10, 30 lb.)	Sharp freezer	200,000	1,400,000	1,400,000
Washington Canners Coop. 507½ Main St., Vancouver, Wash.	Vancouver, Wash.	Bestwest, Flavorpac, Norpac	Strawberries, red raspberries, red sour cherries, black cherries, boysenberries, loganberries, youngberries, blackberries, blueberries, prunes	Tins (5, 10, 15, 30, 50, lb.); barrels (50 gal.); cups (1 lb.); packages (1, 2½ lb.); boxes, (30 lb.); cans (No. 10, 12)	Air blast, 10 deg. below zero to zero	2,000,000	3,000,000	.....
Washington Cooperative Egg & Poultry Bellingham, Wash.	.....	.....	Pan-prepared chickens	Waxed cartons, 2 birds per carton, covered with transparent cellulose	.....	.....	.....	.....
Washington Fish Co. 116 South "E." Street, Aberdeen, Wash.	Aberdeen, Seattle, Wash.	.....	Salmon, halibut, black cod	.....	.....	15,000	20,000	25,000
Washington Frosted Foods, Inc. Kent, Wash.	Kent, Wash.	Green Bow, Penguin	Peas, carrots and peas, lima beans, green beans, wax beans, asparagus, brussels sprouts, broccoli, cauliflower, corn on the cob, whole kernel corn, spinach, succotash, zucchini, strawberries, black raspberries, blackberries, apricots, sweet pitted cherries, gooseberries, loganberries, peaches, prunes, purple plum, sour pitted cherries, youngberries, boysenberries	Cans (5, 10 lb.); transparent cellulose (10, 12, 40 oz.); butter board (5 lb.)	Sharp freezer, air blast; 15 to 40 deg. below zero; sharp room prefreezer 19 to 15 deg. above	600,000	1,400,000	2,000,000
Washington Packers, Inc. Sumner, Wash.	Sumner, Puyallup, Wash.	Dewkist, Kol-Pak, Frostkist	Rhubarb, gooseberries, strawberries, loganberries, red raspberries, black raspberries, red pie cherries, black sweet cherries, prunes, youngberries, boysenberries, blackberries, huckleberries, blueberries, apples, squash, peaches, apricots, corn, green beans, lima beans, spinach, broccoli, cauliflower, brussels sprouts, peas, carrots, peas and carrots, currants, asparagus	Waxed carton with transparent-cellulose bag and waxed paper label (10 to 14 oz.; 1, 2½, 5 lb.), tins (5, 10, 15, 30 lb.), barrels (50 gal.)	Air blast, sharp freezer	8,774,000	6,600,000	7,500,000
Waterman & Sons, Inc. Ontario Center, N.Y.	Commercial freezer	Lake Shore	Cherries	Barrels (450 lb.); tin cans (10, 15, 30, 50 lb.)	Air blast, 20 deg. below zero	800,000	600,000	600,000
Webster Canning & Preserving Co. Webster, N.Y.	Webster, Ontario, N.Y.	Webster	Strawberries, RSP cherries	Tins (5, 10, 15, 30 lb.); wood barrels (450 lb.)	Sharp freezer	100,000	200,000	400,000
Theo. Weissich Fish Co. Eureka, Calif.	Eureka, Calif.	Humboldt	Crabmeat, salmon	Tins, parchment-paper lined	Sharp freezer, at 15 deg. below zero	.....	.....	.....
Western Oregon Packing Corp. Corvallis, Ore.	.....	.....	Corn on cob, berries, cherries, prunes	.....	.....	.....	.....	.....
Westfield Planters Cooperative Fruit Products, Inc. 60 Franklin St., Westfield, N.Y.	Westfield, N.Y.	Westfield Maid	Strawberries, raspberries, cherries	Barrels; cans (30 lb.); tins for small fruits (10 lb.)	Z process	.....	.....	.....
Whidby Island Berry Growers' Assn. Langley, Wash.	.....	.....	Strawberries	Tins (10, 30 lb.), barrels (50 gal.)	Sharp freezer	.....	337,500	300,000
Whiz Fish Products Co.	Seattle, Wash.	Whiz	Salmon, halibut, sablefish, ling cod, fillet	Wood boxes (from 10 to 400 lb. net)	Sharp freezer, 40	.....	.....	.....

Products, Inc. 60 Franklin St., Westfield, N.Y.				for small fruits (10 lb.)				
Whidby Island Berry Growers' Assn. Langley, Wash.			Strawberries	Tins (10, 30 lb.), barrels (50 gal.)	Sharp freezer		337,500	300,000
Whiz Fish Products Co. 1525 Alaskan Way, Seattle, Wash.	Seattle, Wash.	Whiz	Salmon, halibut, sablefish, ling cod, fillet of sole, red snappers, smelt, tuna	Wood boxes (from 10 to 400 lb. net)	Sharp freezer, 40 deg. below zero			
Warren Wiley Kent, Wash.			Rhubarb, prunes, cherries, apricots, peaches, loganberries, blackberries, wild blackberries, huckleberries, red and black raspberries, youngberries, strawberries					
B. Wilson Co., Ltd. 536 Herald St., Victoria, B. C., Canada	Victoria	Wilson's	Peas, green beans, lima beans, asparagus, corn on cob, corn kernels, strawberries, raspberries, loganberries, cherries	Cartons (12 oz., 2½, 5 lb.), cups (15 oz.), cans (10 lb.)	Air blast	74,000	65,000	125,000
Witt's Med-O-Sweet Farm Osseo, Minn.	Osseo, Minn.	Med-O-Sweet, Osseo	Strawberries, raspberries, peaches, poultry, asparagus, green beans, cooked shrimp, lobster tails, smelts, rabbits (all meats for locker patrons)	Tins (30 lb.); waxed cartons (1 lb.); Cryo-Vac 1 to 10 lb.	Sharp air blast, 15 deg. below zero	61,000 Ten percent of production is for locker patrons	69,000	77,000
Z Pack Corp. 60 State St., Boston, Mass. (Does not freeze, but licenses freezing system)	System used at Riverhead, N.Y.; Sioux City, Iowa; Norfolk, Neb.; Hammond, La.; Exmore, Va.; New Ulm, Minn.; Neosha, Mo.; New Bedford, Mass.; Rhinebeck, N.Y.	Packers brands	Fruits and vegetables, fish, poultry	Mostly bulk	"Z" pack	4,559,394	4,531,602	7,607,910
Zeropack Co. Second & Race Sts., Cincinnati, Ohio	Winchester, Va.	Zeropak	Apples, peaches, strawberries, other small berry fruits	Tins (10, 30 lb.)				

MASS-FLO CONVEYOR

LOW INITIAL COST—DUSTLESS



Jeffrey Mass-Flo conveyor (above) handling soy beans in large processing plant. A cross section view of same arrangement at the right.

For mass handling of a wide variety of free-flowing materials — Jeffrey Mass-Flo—in various arrangements:

L type elevator-conveyor (illustrated)

Horizontal-inclined—Horizontal Loop boot type

and these advantages:

Self-cleaning—Self-feeding

Conveys and elevates

Operates at full or partial load

Handles material without breakage or dust

Low initial cost—low upkeep

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More detailed information on how the Mass-Flo can serve your handling requirements more efficiently and economically—in Catalog No. 730—send for it.

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See Page 144 for "WHERE TO STORE FROZEN FOODS"

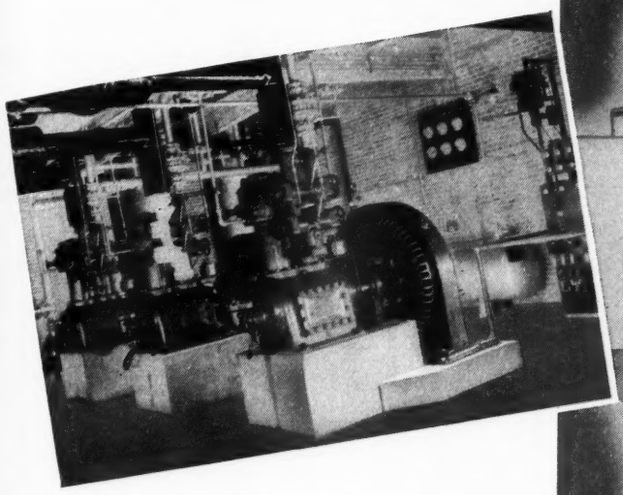
FROZEN FOODS DIRECTORY SUPPLEMENT

Information in this supplement is repeated from the 1939 Edition of the Frozen Foods Directory, no further information on the companies listed being available.

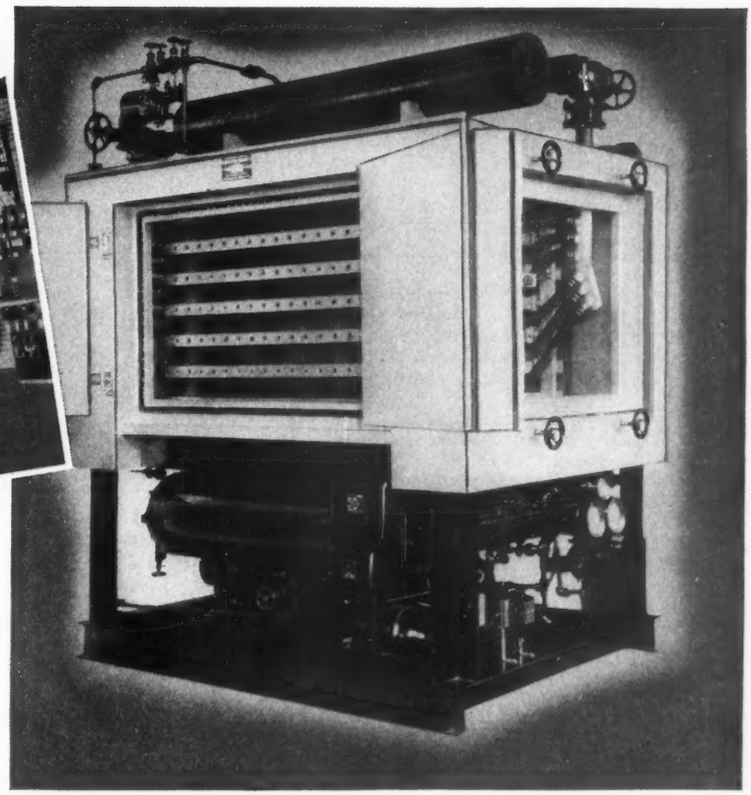
Company	Freezing plant location	Brand	Products	Containers	System	1937 output (lb.)	1938 output (lb.)	Intended 1939 output (lb.)
Mrs. H. J. Aase..... Gilbert, Minn.	Virginia, Minn.....	Bec-i-Dee.....	Raspberries, strawberries.....	2 and 5 lb. Sealright cartons; 2½ lb. cans lined with waxed paper; 70 lb. wooden tubs	Air blast.....	1,000	2,500	4,000
Alton Canning Co., Inc..... Alton, N.Y.	.....	.....	Cherries.....	.....	.....	.....	400,000	.....
Apple Growers Assn..... Hood River, Ore.	Portland, Ore.....	Hood River, Flawless, Diamond	Strawberries.....	Tins (30 lb.);barrels (50 gal.)	Sharp freezer.....	290,000	60,000	60,000
H. B. Biggar..... Fruitland, Ont., Canada	.....	.....	Cherries.....	.....	.....	.....	.....	.....
Borden Dairy Delivery Co..... Fresno, Calif. (Freezes for own use)	.....	.....	Peach purée, boysenberry sauce, nectarines. (Experimenting with figs, grapes, boysenberries, strawberries, plums, apricots, cranberries, apples)	.....	Frozen in room at —10 to —15 deg. under cold blast of air	160,000	800,000	.....
Boston Fish Co..... 18 Fish Pier, Boston, Mass.	Boston, Mass.....	None.....	Fillets: haddock, cod, pollock, hake; mackerel, swordfish, scallops	Wooden boxes (15, 100, 150 lb.)	Air blast.....	100,000	50,000 to 75,000	50,000 to 75,000
Central Creameries, Ltd..... Charlottetown, P.E.I., Canada	.....	Kold Pak.....	Strawberries.....	.....	.....	11,000	15,000	20,000
Russell Champion & Sons..... Kensington, P.E.I., Canada	Kensington, P.E.I.....	Champion.....	Meats, poultry, fish, strawberries, raspberries, blueberries	Wood boxes for meats and fish; paper cartons for berries	Sharp freezer.....	154,000	200,000	.....
Eastern Shore Canning Co., Inc..... Machipongo, Va.	Machipongo, Va.....	Eastern Shore, Escco	Lima beans.....	Friction-top tin cans (5 lb.); paper cartons (1 and 2 lb.)	Air blast.....	150,000	50,000	200,000
Erb's Kadota Fig Gardens..... Waterford, Calif.	Waterford, Calif.....	Erb's.....	Figs.....	Cartons (12 oz.); tins (8 lb.).	Air blast.....	3,000	None	.....
Farmers Commission House..... 403 W. 14th St., New York, N. Y.	.....	F.C.H.....	Long Island ducks (ready to cook).....	Wrapping transparent cellulose	Z process.....	(Output included in that of Z Pack Corp.)		
40 Fathom Fisheries..... Boston, Mass.	Boston, Mass.....	40 Fathom.....	Fish fillets.....	Wooden boxes and cartons (5, 10, 15, 20 lb.)	Formerly air blast; in future Birds Eye	.....	.....	.....
Frost Sealed Products, Inc..... Sumner, Wash. (Freezes for Food Associates, Inc., Seattle and San Francisco)	Sumner, Wash.....	Northwind, Frostkraft, Kwikway	Peas, cut corn, corn on cob. (In 1939 will also freeze strawberries, loganberries, raspberries, wild blackberries, rhubarb, peaches, peas and carrots, spinach, broccoli and green beans)	" Cello-wrap " cartons.....	Air blast.....	600,000	1,200,500	1,500,000
Frostkraft Packing Corp..... 185 Lombard St., San Francisco, Calif. (Freezes for Food Associates, Inc., San Francisco and Seattle)	San Francisco.....	Frostkraft.....	Peaches, apricots, figs, melons, grapes, string beans, brussels sprouts, cauliflower, broccoli, zucchini, Swiss chard, spinach, peas, lima beans, butter beans, artichoke hearts, artichoke bottoms, asparagus	Telescope type (12 oz., 2½, 5 lb.)	Air blast.....	.....	750,000	2,000,000
Fruit Growers Cooperative..... Sturgeon Bay, Wis.	Fruit Growers Coop. or private brand	Sturgeon Bay, Wis. Initial freezing done in Chicago and Minneapolis, also	RSP Cherries.....	Tins (16 and 30 lb.); barrels; half barrels	Sharp freezer.....	2,000,000	1,200,000	2,000,000
Gresham Packing Co..... Gresham, Ore.	Gresham, Ore.....	None.....	Strawberries, raspberries, loganberries, boysenberries, youngberries, blackberries	Cups (1 lb.); cartons (12 oz., 2½, 5, 10 lb.); tins (10, 15, 30 lb.); barrels (30, 50 gal.)	Sharp freezer.....	1,500,000	1,500,000	1,500,000
Harold E. Hamblen, Inc..... 479 First Ave., New York, N. Y.	.....	Haven.....	Fish and seafoods — various kinds of fish fillets	Fillets individually wrapped in transparent cellulose and packed in 5 lb. cartons; scallops in 12, 16 oz. cups; oysters in 10 oz. cups	Z process.....	(Output included in that of Z Pack Corp.)		
Havana Canning Co..... Havana, Fla.	Jacksonville, Fla.....	Le-Ko.....	Blackberries and blueberries.....	Barrels.....	Sharp freezing....	52,355	610,000	500,000

Rings, Valves, Evaporators

STAY CLEAN!



CARBONDALE vertical duplex ammonia compressors. For efficient, trouble-free lubrication in any type refrigeration unit with any refrigerant, use *Texaco Capella Oil.*



BIRDSEYE FROSTED FOODS portable quick-freezing unit with compressor. Ideal compressor lubricants for this and other portable types . . . *Texaco Capella Oils.*

REGARDLESS of the size or type of refrigerating units you operate, and regardless of the refrigerant used, you are assured of long-lasting, highly efficient lubrication when you use *TEXACO CAPELLA OILS.*

Strongly resistant to sludge formation, *Texaco Capella Oils* help to keep piston rings free and valves clean and tight-shutting. In addition, the new low pour-points of these oils insure greater evaporator efficiency.

Texaco Capella Oils are so completely dehydrated that they pass 25,000-volt dielectric strength tests. They are packed in refinery-sealed containers.

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INFORMATIVE, practical: Selection of Lubricants in Refrigeration Service, a 56-page book on refrigerating equipment and its lubrication, latest edition. Yours for the asking.

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TEXACO Capella Oils

FROZEN FOODS DIRECTORY SUPPLEMENT

Company	Freezing plant location	Brand	Products	Container	System	1937 output (lb.)	1938 output (lb.)	Intended 1939 output (lb.)
L. G. Haviland & Sons..... Highland, N. Y.	.....	.....	Currants and raspberries (products usually packed on custom order)	Barrels.....	Sharp freezing....	.....	.....	.....
E. B. Holton..... Webster, N. Y.	Webster, N. Y.....	Holton.....	Sour cherries.....	Barrels; tins (50, 25, 15 lb.).	.....	.....	400,000	" Double if crop is good "
Island Cold Storage..... Charlottetown, P. E. I., Canada	.....	.....	Strawberries.....	.....	.....	.....	.....	.....
Jory Packing Co..... Salem, Ore.	.....	Ever Fresh.....	Whole kernel corn, corn on cob.....	.....	.....	.....	.....	.....
W. F. Kolbe & Co., Ltd..... Port Dover, Ont., Canada	.....	.....	Fish.....	.....	Kolbe (floating pan; diving bell)	1,000,000	1,000,000	1,250,000
Howard Leavens..... Picton, Ont., Canada	.....	.....	Cherries, strawberries.....	.....	.....	.....	.....	.....
Lunenburg Sea Products, Ltd..... Lunenburg, Nova Scotia, Canada	Lunenburg, N.S.....	Highliner.....	Haddock, cod, sole, halibut, scallops smoked fillets, mackerel, herring, finnan haddies	1, 5 lb. cartons; 10, 15 lb. wood boxes. Cartons are wrapped in transparent-cellulose	Birds Eye (for cartons); air blast (for boxes)	2,500,000	3,000,000	3,000,000
L. C. Mays Co., Inc..... 423 Gravier St., New Orleans, La.	Hammond, La.....	Mayco.....	Strawberries.....	Barrels and cans.....	Sharp freezer.....	.....	.....	.....
Walter Mills & Sons, Inc..... 330 W. First St., So. Boston, Mass.	Fish Pier, Boston, Mass. (Commonwealth Cold Storage Co.)	Aberdeen, Maple Leaf	Fresh fillets, smoked fillets, finnan haddies, kippered herring	Wooden boxes and cartons (10 to 50 lb.)	.....	700,000	100,000	100,000
Morrison Fish Co. of New York, Inc.... 1010 Walabout Market, Brooklyn, N. Y.	.....	.....	Lobster.....	Paper cups.....	.....	.....	.....	.....
Oswald & Taube Co..... Cincinnati, Ohio	.....	.....	Frozen fruits.....	Cans (10, 15, 30 lb.); barrels.	.....	.....	.....	.....
Paulus Bros. Packing Co..... Trade & High Streets, Salem, Ore.	.....	Blue Tag.....	Strawberries, loganberries, red cherries...	Barrels (50 gal.).....	Sharp freezer.....	.....	.....	.....
Santa Cruz Fruit Packing Co..... 1175 57th Ave., Oakland, Calif.	Santa Cruz, Calif.....	.....	Vegetables.....	Simplex cartons (10, 12, 14, 16 oz.)	Air blast.....	None	40,000 (experimental pack)	1,500,000
Southern California Youngberry Growers' Assn. 1807 E. Olympic Blvd., Los Angeles, Calif.	.....	.....	Berries.....	.....	.....	.....	.....	.....
Spencer Packing Co..... 688 Third St., Lebanon, Ore.	Lebanon, Ore.....	Spencerian.....	Strawberries, red raspberries, black raspberries, loganberries, youngberries, boysenberries, prunes	Tins (15 and 30 lb.); barrels (30 and 50 gal.)	Z process.....	400,000	350,000	.....
A. L. Stewart & Sons..... Cherryfield, Me.	Portland, Me.....	Stewart's.....	Blueberries.....	Wooden boxes (30 lb.).....	Sharp freezing....	.....	.....	200,000 to 500,000
Twentieth Century Frosted Foods Corp. 535 North Medina St., San Antonio, Tex.	Twentieth Century.....	San Antonio, Tex.	Vegetables and fruits.....	Cardboard containers (1, 3, 5 lb.)	Air blast.....	135,000	200,000	200,000
Vicana Foods, Inc..... Obrapia 19, Havana, Cuba	Havana, Cuba.....	Vicana.....	Sliced and crushed pineapple.....	Round containers, paper bags in paraffined cardboard boxes	Z process.....	None (Output included in that of Z Pack Corp.)	250,000	300,000
Wegner Canning Corp..... Sodus, N. Y.	Sodus, N. Y.....	Wegner.....	Cherries.....	Tins (10, 15, 30 lb.); barrels (450 lb.)	Subzero temperatures in cold storage plant	900,000	800,000	800,000
E. A. Weilbacher Co..... 1300 Factory Place, Los Angeles, Calif.	.....	Finest Food.....	Apricots, peaches.....	All sizes (5, 10, 20, 50 lb.)...	.....	36,000	40,800	100,000
Williamette Valley Prune Assn..... S. E. Cor. Trade & High Sts., Salem, Ore.	Salem, Ore.....	.....	Strawberries, blackberries, pitted prunes..	Tins (30 lb.); barrels.....	Sharp freezer.....	10 cars	.....	.....
Wisconsin Fishing Co..... Green Bay, Wis.	Green Bay, Wis.....	None.....	Fish.....	Boxes, cartons and bulk....	Ice and salt.....	500,000	500,000	200,000
J. G. Wright..... Wilson, N.Y.	.....	.....	RSP frozen cherries.....	Cans (30 lb.); barrels (450 lb.)	.....	.....	.....	.....

The Food Industry News

GENERAL NEWS, BUSINESS TRENDS, MEN, JOBS AND COMPANIES • DECEMBER, 1940

Food Industry Put on Carpet In Nation-wide Investigation

Processors will bear brunt of Federal antitrust drive to aid consumers and farmers. Eighteen cases cited, more expected

NATION-WIDE INVESTIGATION of restraints which raise food prices to the consumer and reduce the prices received by the farmer was announced on November 25 by the Department of Justice. This investigation will deal with processors of food, commission merchants, organized produce exchanges and auctions, truckers and wholesale and retail distributors. The major items in a family food budget will be investigated at every stage from the farmer to the ultimate consumer. Particular attention will be given to bread, milk, meat, fish, cheese, canned fruits and vegetables, and fresh fruits and vegetables.

The occasion for the investigation, according to the Department of Justice, "is recent evidence that the food industries function badly for both consumers and farmers. At one end of the food industries lies wholesale malnutrition among consumers due to their inability to afford an adequate diet. At the other end lies a population of producing farmers who must sell an abundance of food at distress prices so low as to threaten them with bankruptcy. Between are industrial groups, many of which are so close knit and powerful that they have made satisfactory profits throughout the depression. A rough indication of the relative strength of such groups is the fact that processors and distributors now receive about 59 or 60 cents of the average dollar which the consumer spends for food, whereas between 1913 and 1920 they received only from 40 to 48 cents of that dollar."

Although most of the Antitrust Division's staff is still occupied with cases in progress in other industries, investigations of eighteen situations in the food industries have already begun. The following summary indicates the nature of the investigations in progress, but since all of them were undertaken recently, the Division does not yet know to what extent the truth of the charges will be established.

Bread

Two investigations involve complaints that associations of bakers fix the price of bread and attempt to destroy independent bakers by price cutting in the particular localities in which such independents operate. Where such price fixing exists, it is alleged that the price of bread would otherwise be lower by at least 1 cent per loaf.

Meat

One investigation involves complaints that in a large city certain concerns slaughtering meat have increased their price an average of 5 cents per pound by limiting and allocating the amount of slaughtering done locally and by use of devices to prevent importation into the city of meat slaughtered elsewhere.

Poultry

Two investigations involve charges that in large metropolitan markets the price of poultry is fixed by fictitious auctions at which a few collusive transactions take place at high prices in order to establish a so-called market price to be used in sales outside the auction during the rest of the day.

HEADS NCA

Philip P. Gott was elected full-time president of National Confectioners Association at its meeting last month. Mr. Gott formerly was manager of the Trade Association Department of the Chamber of Commerce of the United States. Hitherto NCA did not have a full-time president. With his leadership the confectioners expect to substantially enlarge their program of constructive work.

Fish

In two fish cases complainants charge that associations of fishing boat owners and associations of fish canners make annual agreements to exclude independent fishermen from the market and to fix the prices of two varieties of fish throughout the United States.

In a third fish case the charge is that the price of a variety of fish is fixed by the collusive action of a few brokers who have become the handlers of substantially the entire catch.

Milk

In one city the Department is investigating complaints that dairy companies and milk distributors have agreed to maintain the price of milk and to handicap its sale through retail stores or in large containers.

In another milk case it is alleged that under pretext of administering a state milk control law a control board has ignored mandatory provisions of the law designed to protect the right of stores to sell milk below the price for delivery at the buyer's door; has established property rights in quotas for the sale of milk and required the pooling of income from sales made in excess of allotted quotas; has prosecuted those who sell milk with a high butterfat content; and has discriminated in favor of those who are members of a dairymen's association. By such practices, it is alleged, the retail price of milk moving in interstate commerce into portions of this state has been raised 3 cents higher than in comparable areas of surrounding states without appreciable increase in the prices received by farmers, and in the chief center of population the consumption of milk has been reduced by 12 percent.

Fruits and Vegetables

In one fruit case it is alleged that a canners association has agreed to fix the buying price paid to growers for an important variety of fruit and that, although the pretext for this agreement is to establish a higher price than last year, the actual intent and effect are to limit the price increase to less than that which would have occurred in a free market.

In another fruit investigation the complaints allege that under the pretext of conformity with a state law designed to protect growers, a canners' association, which includes certain canners who are also large growers, has manipulated its buying price for a variety of fruit through the instrumentality of these canner-growers and has fixed the selling price of the canned fruit without any sanction from the applicable law. It is charged that by such procedures the growers have been forced at times to accept less for their fruit than before the plan was inaugurated, whereas the profits of the canners have been substantially increased.

In a regional investigation involving an important vegetable, the complaints allege that the principal commission merchants and distributors through whom this vegetable moves to market have

agreed to manipulate the buying price to the detriment of the grower.

Cheese

In one case involving natural cheese it is alleged that a few transactions in a fictitious cheese auction are used by the principal cheese producers to fix the price of natural cheese throughout the United States.

In another cheese case it is alleged that by abuses of patent rights and of terms upon which process cheese is distributed, an attempt is being made to create a monopoly in the sale of processed cheese throughout the country, and that one company already controls 80 percent of the national market.

Ice

Complaints which are being investigated in two cities charge that ice manufacturers have conspired to fix prices and to eliminate independents by intimidation of dealers who handle independent ice and by purchase of the independent plants in order to close them down.

Retail Grocers

In one case it is alleged that an association of retail grocers, under the cloak of state laws against sales below cost, has prepared fictitious estimates of cost and has raised and fixed sale prices without regard to cost.

Terminal Markets

In one case it is charged that fruits, vegetables and poultry reaching an important terminal market are subjected to certain arbitrary and unnecessary handling charges by unloaders and truck owners and operators, which result in substantially increasing the sale price of these commodities.

In addition to these cases which are now under investigation, men have been assigned to prepare preliminary plans of investigation for three large cases in which field investigations cannot begin until a substantial staff can be assigned to each. Many other smaller cases are awaiting investigation when personnel becomes available.

New Test for Wrappers Adopted by Paper Group

A NEW standard test method for determining the water-vapor permeability of wrapping materials has been adopted by Technical Association of the Pulp and Paper Industry. In this TAPPI procedure the material is sealed over the open mouth of a dish containing either moisture-absorptive material or water. The assembly is then exposed to an atmosphere of controlled temperature, humidity and ventilation. By weighing the test vessel at intervals, the rate of gain or loss of moisture is determined. Thus, the effectiveness of the sheet material for wrapping purposes is indicated.

Food manufacturers desiring to test various wrapping materials which they use, or are considering for use, may get instructions regarding the test procedure and apparatus from the chairman of TAPPI's committee, Mr. B. W. Scribner, National Bureau of Standards, Washington, D. C.

Advisory Committee Created To Steer Army's Food Buying

Policy is to split purchases from processors so as to avoid shift in markets due to concentration of men in camps

A Food Procurement Advisory Committee representing major wholesale food buying groups was set up late in November to work with Douglas C. MacKeachie, assistant to the defense purchases coordinator, in anticipating and meeting general procurement problems and, when necessary, furnishing temporary personnel to assist in buying policies.

Following out its major announced objective, the committee at once began an inventory of wholesale buyers and their availability for three-week to three-month service on call by the government. In addition, the committee also initiated a survey of available private warehousing to store Army purchases.

As for the committee's function as an adviser on procurement problems it was pointed out that the Army and defense commission food sections have been alive for some time to the general problems of shifting the distribution of foodstuffs as a result of taking men away from normal retail markets and concentrating them in camps.

Generally speaking, the policy adopted for solving this problem will be to deal directly with processors and seek to so split up purchases as to take from each roughly the percentage of his product which normally would have gone into the territory he serves or, in cases of national distributors, the amount which normally would have been consumed at home by the men shifted to Army training camps.

Members of the advisory committee are Hector Lazo, executive vice president of the Cooperative Food Distributors of America, chairman; John A. Logan, president of the National Association of Food Chains, secretary; J. Frank Grimes, National Voluntary Groups Institute; Roland Rowe, United States Wholesale Grocers Assn.; W. Garfitt, United Fresh Fruit and Vegetable Assn.; Horace Herr, National League of Wholesale Fresh Fruit and Vegetable Distributors; R. M. Kiefer, National Assn. of Retail Grocers; and M. L. Toulme, National American Wholesale Grocers Assn.

Gas Ripens Vanilla Beans Quicker, Improves Flavor

SUCCESSFUL use of ethelene gas to speed the ripening and improve the flavor of vanilla beans has been reported from the Federal Agricultural station in Puerto Rico. Experiments have been conducted solely with local crops. Overnight exposure appears to be all that is necessary, and dilutions of one to 10,000 and one to 100,000 work equally well.

The greatest liability shown to result from this procedure is an increase in the number of "splits" occurring in the beans during curing. Tests already made are inconclusive as to whether the loss from increased splits offsets the price advantage resulting from the better flavor of the beans which have been treated.

British Combine photo

CANS CHICKEN FOR IMPRISONED BRITISH

In recent weeks a big British food plant in London has been busy canning chickens to be sent to British prisoners of war in Germany for Christmas. The dispatch of this luxury is being arranged by the British Red Cross. Cynics wonder if the chicken will reach its intended destination.

Dissension Softens On Dietary Labels

Much earlier opposition on part of industry vanishes at the latest session with F&DA

THE BRIEF recess between the second part of the dietary foods hearing and the third part, during which the dairy industry convention was held at Atlantic City, provided opportunity for crystallizing thinking. Many misapprehensions or misunderstandings which existed in the early part of the hearing apparently disappeared and the hearing ended on a very amicable note.

About the only question that has been discussed vigorously is the minimum requirements of vitamins B_1 and C. The feeling was expressed by a number of the industry representatives that these minimum requirements should be higher than the food and drug proposals in the *Federal Register* of September 5.

Considerable time was spent in discussing the meaning of the word "added." The feeling on this subject was that vitamin D concentrates were "added" to milk but vitamin D irradiation was not an "addition." This matter of wording will probably be cleared up in the final standards.

In general, the problem will be squarely upon the manufacturer. In those foods in which natural vitamins and minerals are present, their presence may be declared in a variety of ways without classifying the foods as dietary. However, as soon as claims are made for those foods because of their vitamin and mineral content, the quantitative label declaration and prescription will be necessary.

Milk was used as a hypothetical example to illustrate this philosophy. Milk as a vitamin D carrier has come into widespread use in the past few years. Advertising of vitamin D milk has been, on the whole, quite acceptable. However, an advertisement was said to have appeared recently which said, in effect, "Drink our milk and avoid the flu." Here a medical claim is being made, and a prescription would be required.

Will Show What's New For Process Industries

FOOD TECHNOLOGISTS and engineers will have an opportunity to see at Chicago this month the things that are new in supplies and equipment for the process industries. There will be held at the Stevens Hotel, December 11–15, the National Chemical Exposition, a new show for the industry coming between the dates of the biannual exposition held in New York. And as an added attraction, an Industrial Chemical Conference will be held during the Exposition, this being sponsored by the Chicago section of the American Chemical Society.

New discoveries and developments in the service of chemistry and its application and progress in many fields of activity will be discussed by foremost authorities at the Conference. Two of the papers of particular interest to the food industries will be: "Service of Chemistry to Human Nutrition," by C. A. Elvehjem, University of Wisconsin, and "Service of Chemistry to Agriculture," H. G. Knight, Bureau of Agricultural Chemistry and Engineering.

British Combine photo

BOMB HITS BAKERY

Bread and bricks were all mixed up after this London bakery was damaged by a bomb during a Nazi night raid. It can't happen here, we hope.

Gelatine Makers Fail To Meet FDA's Desires

Problem of package fill is still unsettled despite further conferences in Washington

FURTHER conferences during November failed to iron out the year-long dispute of what constitutes a "misleading" package under the Federal Food, Drug and Cosmetic Act between the three largest gelatine desserts manufacturers and the Food and Drug Administration. There is no immediate intention by the FDA, however, to force a showdown by making seizures.

The three manufacturers—General Foods Corp. ("Jello"), Standard Brands, Inc., ("Royal"), and Great Atlantic and Pacific Tea Co. ("Ann Page")—jointly argued that they would meet the law's requirements by increasing present packages from 50 to 70 percent filling.

FDA bluntly replied that 70 percent filling would not be satisfactory, although it hasn't said what "satisfactory" would be, except to point to its agreement with spice packers in which an 85 percent filling was approved. The law declares a food product misbranded "if its container is made, formed or filled as to be misleading."

The catch in the dispute is that to reduce the size of their packages, gelatine packers say they would have to scrap their packaging machinery.

Program of Research on Foods Set for Regional Laboratories

Work to be done on apple juice, freezing temperatures, potato starch, cornstarch, cottonseed, sweet potatoes, peanuts

IN A SERIES of Washington conferences in recent weeks, the initial programs of the Department of Agriculture's four new regional research laboratories has been crystallized. Two of the laboratories already are in operation, still on a partial basis. The third is to be opened this month, and the fourth within a few weeks.

Strictly food problems which have been set up in the normal program include research on apple juice, concentrates and frozen slices, at both the Eastern and Western laboratories; and on the use of freezing temperatures (including regular frozen pack and preparation of concentrates by freezing) and utilization of pectin, at the Western laboratory. In addition, the Philadelphia laboratory is to look into the problem of white potato starch.

The Northern laboratory at Peoria, Ill., opening early in December, has set up projects on the properties and uses of cornstarch, research on production of alcohol, and a search for wider uses of agricultural residues, including a study looking toward reducing the costs of collection and storage.

Cottonseed, sweet potatoes and peanuts are the leading products on the agenda of the Southern laboratory at New Orleans. The problems with sweet potatoes, grown for starch, will include attempts to develop mechanical harvesting and find ways to pulp or dehydrate potatoes in storage—all looking toward reducing the raw material price without cutting farm income. The research on peanuts will be toward increasing the yield in the hope of bringing prices to the point where industrial uses can be developed. These, of course, are only some of the projects on the laboratories' lists, but generally speaking they include the most promising.

In the background, however, is the possibility that the present normal program of the laboratories will be pushed aside to make room for a considerably more concentrated and expanded national defense assignment.

Food May Go to Spain If Credit is Granted

LARGE American credits for Spain, talk of which began with trial balloons late in November, will have importance to the food industry if they materialize. Spain's chief need of foreign aid is for food, and any deal which is developed is sure to include wholesale distribution of food products, particularly wheat and flour.

In the initial stages of the negotiations, however, it appeared more likely that U.S. foodstuffs would go to Spain, if at all, as an outright relief gift rather than as a commercial sale. Undersecretary Welles, it will be remembered, said pointedly he felt that any Spanish aid was a Red Cross matter—meaning that food would be purchased from the $50,000,000 American war relief fund and sent abroad for distribution under Red Cross direction. This method would be designed to insure that Spain actually used whatever is sent.

Meat Inspection Modified

SIXTEEN slight modifications in the Federal meat inspection regulations have been made to cover the new definitions of lard and rendered pork fat which were adopted in August. These modifications were issued as Amendment 14 of "B.A.I. Order 211, Revised," printed in the *Federal Register* for October 29, 1940.

ELECTED PRESIDENT

Dr. Clark E. Davis, vice-president of Virginia Dare Extract Co., Brooklyn, N. Y., was elected president of National Manufacturers of Soda Water Flavors at the meeting in Cincinnati last month.

Vinegar Makers Placed Under New Regulations

DISTILLED vinegar manufacturers will operate under new Internal Revenue regulations after January 4, 1941. These new regulations are printed in full in the *Federal Register* for November 9, 1940.

Provision in the regulations is made for the smallest details. Plant location and use of premises are specified. The manner in which buildings and rooms may be built is also considered at length, even to the doors, windows and posting of a sign on the front of the factory.

Specifications are given in similar detail not only for fermenters, stills, and condensers, but even the pipes and tanks and the required colors which the pipe lines must be kept painted.

Qualifying documents, plats and plans must be kept in a certain form, and notice must be given of changes in name, proprietorship, control, location, premises and equipment.

Plant operation steps are outlined, and proprietors records and reports are indictated.

Instructions to government officers also require nearly two pages of the regulations.

Schedule of Current Action on Food Standards

(Dockets 1 to 6, 8, 9, and 13 to 20 have been completed and dropped from this table*)

STANDARDS hearings proceeded along normal and expected lines during November. Progress was made on three subjects, flour, dietary foods and margarine.

The flour standards hearing adjourned on November 16 after a week of discussion of vitamin and mineral fortification. Briefs will be due on this hearing by December 17.

The dietary foods hearing adjourned on November 1. Briefs in this docket were due by November 25.

The margarine hearing recessed, after a three-day session, until November 26.

The chocolate products hearing, announced in the *Federal Register* for October 19, will convene on Monday, Dec. 9.

The following table brings up to date all actions on the food standards program since the last printing of this table in September, page 66.

	Docket number and commodity	Type of standard or regulations	Presiding Officer	A First announced in *Fed. Register*	B Initial hearing date	C Preliminary briefs due not later than	D Examiner's findings published in *Fed. Register*	E Secretary's order published in *Fed. Register*	F Effective date of order
7-A	Cream			Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	July 2, '40	Sept. 30, '40
B	Whipping cream			Mar. 28, '39	May 1, '39	July 27, '39[1]	Sept. 26, '39	July 2, '40	Sept. 30, '40
C	Evaporated milk	Identity	P. S. Hassell	Mar. 28, '39	May 1, '39	July 27, '39[1]	June 4, '40	July 2, '40	Mar. 1, '40[4]
D	Sweetened condensed milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	June 4, '40	July 2, '40	Sept. 30, '40
E	Dried skim milk			Mar. 28, '39	May 1, '39	July 27, '39[1]	June 4, '40	July 12, '40	Jan. 7, '41[5]
10-A	Fruit jams	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	June 25, '40	Sept. 5, '40	Dec. 4, '40
B	Fruit jellies	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	June 25, '40	Sept. 5, '40	Dec. 4, '40
C	Fruit butters	Identity	M. F. Markel	Aug. 11, '39	Sept. 11, '39	Jan. 5, '40[1]	June 25, '40	Sept. 5, '40	Dec. 4, '40
11-A	Cheddar cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40[6]	.....	.....
B	Washed curd cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40[6]	.....	.....
C	Colby cheese			Aug. 22, '39	Sept. 25, '39	Dec. 22, '39[1]	Oct. 2, '40[6]	.....	.....
12	Cream cheese	Identity	W. G. Green, Jr.	Aug. 22, '39	Oct. 2, '39	Feb. 5, '40[1]	.....	.....	.....
21-A	Flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40[1]	Dec. 17, '40	.....	.....	.....
B	Durum flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
C	Whole-wheat flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
D	Cracked wheat	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
E	Crushed wheat	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
F	Whole durum wheat flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Oct. 28, '40	.....	.....	.....
G	Self-rising flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
H	Phosphated flour	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
I	Farina	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
J	Semolina	Identity	A. W. Willcox	Aug. 3, '40	Sept. 9, '40	Dec. 17, '40	.....	.....	.....
22	Tomato catsup	Identity[2]	W. G. Green, Jr.	Aug. 10, '40	Sept. 11, '40	Sept. 24, '40	Oct. 17, '40[6]	.....	.....
23	Canned fruits	Identity[3]	M. F. Markel	Aug. 17, '40	Sept. 16, '40	.....	.....	.....	.....
24	Dietary foods	Label statements	M. F. Markel	Sept. 5, '40	Oct. 7, '40	.....	.....	.....	.....
25	Oleomargarine	Identity	E. B. Williams	Oct. 11, '40	Nov. 18, '40	.....	.....	.....	.....
26	Chocolate Products[7]	Identity	M. F. Markel	Oct. 19, '40	Dec. 9, '40	.....	.....	.....	.....

* Docket 1 pertains to tomato products, 2 to canned tomatoes, 3 to eggs and egg products, 4 and 9 to coal-tar colors and 5 to canned peaches, apricots, pears and cherries. See FOOD INDUSTRIES, October, 1939, page 569; January, 1940, page 70; and February, 1940, page 73, for data on these standards. Docket 6 pertains to canned peas; 8, canned vegetables; 13 and 14, coal tar colors; 15, dietary foods (cancelled); 16, canned tomatoes; 17, flours, 18, canned asparagus; 19 and 20, canned cherries; see FOOD INDUSTRIES, September, 1940, page 66, for data on these dockets.

[1] Time extended from earlier date previously announced.

[2] Amendment to order published in *Federal Register*, July 29, 1939 (Docket No. 1-C).

[3] Amendment to orders published in *Federal Register*, December 22, 1939, and January 9, 1940 (All parts of Docket No. 5).

[4] Postponed from Sept. 30 by order published in *Federal Register* Sept. 10.

[5] Postponed from Oct. 10 by order published in *Federal Register* Oct. 11.

[6] "Tentative order." Under new rules of procedure examiners findings are no longer published.

[7] Including cacao nibs; chocolate liquor; sweet chocolate (coating); skim milk chocolate (coating); buttermilk chocolate (coating); mixed milk, skim milk, buttermilk, malted milk chocolate (coating); cocoa; breakfast cocoa; low-fat cocoa; sweet cocoa and fat (other than cacao fat) coating; and sweet chocolate and fat (other than cacao fat) coating.

Answers to Food Law Questions

Interpretative Opinions from F&DA Letters to the Industry

A recent item in the trade correspondence of the Food and Drug Administration is important to many food manufacturers besides the one to whom the letter was addressed. So that the philosophy of the F&DA may be clearly understood, this letter is reprinted in full below. The other abstracts which follow this letter continue the series which began in the April issue of FOOD INDUSTRIES.

211. "The Food and Drug Administration has issued no specific regulations on the use of *anti-oxidants* in *salad oils*. Proposals have been made from time to time for the addition of various substances, some of which are definitely toxic. It is the responsibility of each manufacturer who proposes to add foreign materials to foods to establish the harmlessness of the substances before doing so. No general list of approved substances has been issued. Where *chemical preservatives* of unquestioned harmlessness are added to oils, the labeling of the container—whether it be a 400-lb. drum or a 5-gal. can—would be required to bear an adequate and conspicuous statement of the presence of the substances by their common or usual names. We have had no disposition to insist upon the labeling of shipments in tank cars. Distributors of such bulk shipments will presumably prefer to take advantage of the exemption established under Sec. 405 of the Food, Drug and Cosmetic Act.

"In view of the fact that the action of the added substances is stated to be one of preservation, the provision of Sec. 403(k) of the Act is pertinent. It requires food containing a chemical preservative to bear 'labeling stating that fact.' You will note from regulation (*a*)(3) under section 403(*k*) that *sugar* is not classed as a chemical preservative. In the employment of the soybean oil in the manufacture of other food products it would be necessary that the label of such food products also bear the statement of the addition of the preservative.

"The language of section 403(*k*) does not specifically say that the name of the preservative be given. However, since the preservative is also an 'ingredient', section 403(*i*)(2) does require it to be specifically named. If the name itself is immediately recognized by the consumer as that of a chemical preservative, it would only be necessary to declare the preservative by name. However, if the public does not generally recognize the name of some substance as that of a chemical preservative, then the label statement should include the common or usual name of the substance, followed by some such phrase as 'a chemical preservative'. If a fabricated food product contains two or more chemical preservatives contribted by different ingredients, they can be indicated by their specific names and the explanatory words 'chemical preservatives.'

"*Mayonnaise* has been temporarily exempted from the requirement for a label declaration of the ingredients which go to make up the product. This, however, does not exempt mayonnaise from the requirements of the declaration of added substances not normal to mayonnaise or from the declaration of the fact that preservatives are added when they are present."

(Editor's Note: The italics in the above letter are ours.)

212. *Canned pea sizes* are best declared on the label by facsimile reproduction; specific sieve-size statements or average diameter in thirty-seconds of an inch are acceptable; the terms "mixed sizes or "ungraded" may be used when appropriate; but other methods of describing size are apt to be misleading to the consumer and should not be used.

213. The term "yam" should not be used (except parenthetically) to describe a

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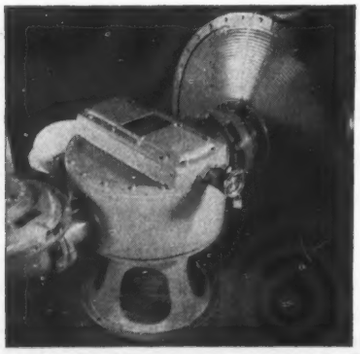

★

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variety of *sweet potato*. If a *packing medium* is desired other than those listed in the standard of identity for sweet potatoes, an amendment to the standard will be needed.

214. When *horseradish* is used as an ingredient in a food, the manner of label declaration is dependent upon the purpose served, *i.e.* whether spice or principal constituent of product.

215. The suitability for use in foods of *chlorophyll* and other *vegetable colors*, as distinguished from coal-tar colors, rests on the manufacturer's responsibility.

216. Canned *pimentos* must not include seeds.

217. (Supplementing 158.) *Monosodium glutamate*, an artificial flavoring, may be termed a "vegetable protein derivative" when such is the case.

218. (Rescinds 179). Pending formulation of definition and standard for *process cheese*, no action will be taken solely because ingredients are not listed, if product is of normal composition.

Add to A.M.S. Standards

To THE LIST of Agricultural Marketing Service standards digested in the October issue of FOOD INDUSTRIES, page 61, should be added the following item:

Canned Yellow Clingstone Peaches
(Final)

The standards for grades of canned yellow clingstone peaches vary only slightly from the standards for freestone peaches. Clingstone peaches may be quartered or whole in addition to the halved or sliced styles. No densities are specified for the sirup used at the time of packing the various grades of clingstone peaches. The cutout sirup densities for water pack, light sirup, and medium sirup are slightly lower than the freestone specifications. Head space and drained weight specifications also vary slightly. The factors of color and absence of defects are given a little different relative weight in the clingstone peaches and Plates 9, L-7 and L-1 are cited. Those interested in canned peaches should note minor differences in these two standards. *Issued, June 21, '40; Effective, July 15, '40.*

SCHEDULE OF EVENTS

DECEMBER

3– 4—American Butter Institute, Palmer House, Chicago.
3– 5—American Society of Refrigerating Engineers, Hotel Commodore, New York.
4—National Dairy Council, Palmer House, Chicago.
4– 6—National Cooperative Milk Producers' Federation, Hotel Fontenelle, Omaha, Neb.
5– 6—Tri-State Packers Association, Ambassador Hotel, Atlantic City, N. J.
11–15—National Chemical Exposition, Stevens Hotel, Exposition Hall, Chicago.
12–13—Northwest Frozen Foods Association, New Washington Hotel, Seattle.
27–29—Society of American Bacteriologists, Hotel Jefferson, St. Louis, Mo.

JANUARY

8–10—Northwest Canners Association, Hotel Multnomah, Portland, Ore.
14—Southeastern Millers Association, Brown Hotel, Louisville, Ky.
15–16—New England Association of Ice Cream Manufacturers, Copley Plaza Hotel, Boston, Mass.
18–25—National Food Brokers Association, Palmer House, Chicago.
19 (week of)—National Canners Association, Stevens Hotel, Chicago.
19–24—Canning Machinery & Supplies Association, Stevens Hotel, Chicago.
19–21—Potomac States Bakers Association, Lord Baltimore Hotel, Baltimore, Md.
20–21—National Preservers Association, Morrison Hotel, Chicago.
22—Evaporated Milk Association, Chicago.
22—National Pickle Packers Association, Palmer House, Chicago.

FDA's OK on Fortified Flour Asked by Millers Federation

More vitamins and minerals would be added than are contained in raw material. New product would be called "Vimin"

THE POSTPONED session of the flour standards hearing, which reconvened on November 12, turned out to be more than just another food standards hearing. At the earlier session in September, Dr. E. M. Nelson of the Food and Drug Administration proposed an enriched flour to which certain minimum quantities of vitamins and minerals should be added. These vitamins and minerals were based on the minimum quantities needed in the entire diet of the average individual, rather than a restoration to the normal vitamin and mineral content of whole wheat. This represented the creation of a new food product, in effect, rather than restoration of a natural product or even standardization of some product already widely available.

The Millers National Federation, speaking for the flour manufacturing industry, asked in September for a recess until mid-November for the purpose of considering this subject further. The specific proposals of the Federation at the November session differed from Dr. Nelson's only in a few details. They were reached after presentation of evidence by such dietetic authorities as Drs. Wilder, Sebrell, Jolliffe, Williams, Harris, Scott and Bailey.

The following table shows the quantities suggested by Dr. Nelson in September and those suggested by the Federation in November. Unless otherwise designated, the units are milligrams per pound of flour, minimum requirement. Maximum figures are four times the minimum in the case of calcium, phosphorus, iron and vitamin D, and 1½ times the minimum for thiamin, riboflavin and nicotinic acid. The Federation suggests this flour be called "Vimin", with only thiamin required at first and the other ingredients optional. Some of the dietetic experts felt that nicotinic acid and iron should also be required in a "vitamin" flour. This vitaminized flour would be made in addition to regular flour.

Vitamin or mineral	*Dr. Nelson (September)*	*Federation (November)*
Calcium	492	492
Phosphorous[1]	492	763
Iron	6.15	6.15
Thiamin (vitamin B_1)	0.48	1.66
Riboflavin (B_2 or G)	1.23	1.23
Vitamin D[2]	246	246
Nicotinic acid	6.15	6.15
Processed wheat germ[3]	..	..

[1] This phosphorous is included in mono-calcium phosphate, the recommended form of calcium addition in the line above.

[2] In U.S.P. units per pound of flour.

[3] Wheat germ is suggested as a source of vitamin B_1, replacing part of the thiamin. Recommended forms are dehydrated or defatted. Wheat germ oil is not recommended.

Maximum figures for the vitamin and mineral addition are given as standards rather than as limits to safe intake by the consumer. While larger quantities would probably not be toxic in any case, they would represent excessive daily intake and unnecessary expense both to the manufacturer and to the consumer. Intermediate grades between minimum and maximum may be established. All figures are based on an average daily consumption of 6½ oz. of flour per person.

Briefs on this case must be filed by December 17.

NEW ABCB PRESIDENT

Ed. Wagner, Wagner & Sons, Cincinnati heads up American Bottlers of Carbonated Beverages for the coming year. He had been a vice-president of the Association for two years. More than 6,000 attended the bottlers' annual convention in Cincinnati last month. And there was great interest in the supplies and equipment exhibited at this fast-growing industry's exposition.

Needs of "Oleo" Makers Cited at FDA Hearing

THE PLAN of the Food and Drug Administration to simplify food standards hearings by having a preliminary informal meeting has had its first test. The oleomargarine hearing in the middle of November was the first hearing to be held after such a preliminary discussion. The proposed definition and standard which was given in the *Federal Register* of October 11 followed very closely the standard proposed by olemargarine manufacturers in the January informal meeting. (See FOOD INDUSTRIES, March, 1940, page 78.)

Although no provision was made in the proposed definition and standard of identity for preservative, it was stated by industry representatives that sodium benzoate or benzoic acid or the combination of these was used in amounts not exceeding 0.1 percent. A majority of the industry was said to use this preservative.

The principal discussion was in regard to amount and type of emulsifying agent which should be permitted. Industry requests ranged from 0.5 to 5 percent, depending on the type. After a three-day session the hearing was recessed until November 26, at which time the emulsifying agent question was to be further discussed.

Citric acid addition was also requested as an optional ingredient for purposes of flavor modification, and there was a number of industry requests for minor changes in the wording of the standard.

Label Exemptions To Run Beyond 2-year Deadline

F&DA officials explain that there will be no abrupt termination of exemptions from required label declaration of ingredients at some arbitrary date in February. At that time it will be two years from the date of announcement of the list of commodities which were to be so exempted from the detailed

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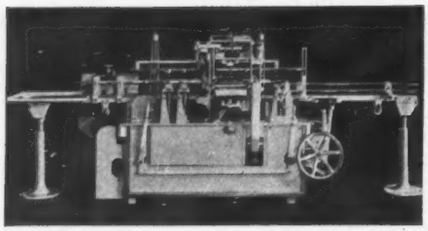

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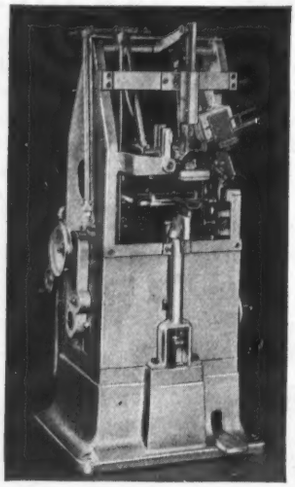

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label requirements of the law, pending the establishment of standards of identity. It was hoped that these standards would be fixed within the two-year period, but many of them have not been completed. This fact is not going to make any sudden change in the policy of F&DA, or in the policy of its administrative superiors in Federal Security Agency.

Future Trading in Fats, Oils To Be Controlled

TRADING for future delivery of fats and oils is to be under the control of the Commodity Exchange Administration, Department of Agriculture. By an amendment of the Commodity Exchange Act, effective December 8, "the word 'commodity' shall mean . . . fats and oils (including lard, tallow, cottonseed oil, peanut oil, soybean oil and all other fats and oils), cottonseed meal, cottonseed, peanuts, soybeans, and soybean meal" in addition to the commodities already regulated (wheat, cotton, rice, corn, oats, barley, rye, flaxseed, grain sorghums, mill feeds, butter, eggs, Irish potatoes and wool tops).

CONSTRUCTION NEWS

	Pending (thousands)	Awarded November (thousands)	Total Awarded 1940 (thousands)
Bakery	$40	$128	$2,528
Beverages	1,125	260	7,564
Canning and Preserving	90	.....	1,043
Cold Storage Plants	.....	.....	710
Confectionery	.....	.....	570
Grain Mill Products	655	175	3,854
Ice Manufactured	.....	.....	271
Meats and Meat Products	.....	85	2,365
Milk Products	160	.....	1,729
Miscellaneous	976	210	6,166
	$3,046	$858	$26,800

CAPITAL VIEWS

MORE TAXES SURE—Two days after election, Secretary Morgenthau announced his request that Congress increase the public debt limit from the present $49 billion to $60 or $65 billion. This indicates the order of magnitude of deficiency in income anticipated during the defense preparation of the next two fiscal years. Unfortunately, even that deficit will not be big enough to make increased taxes unnecessary. And some parts of the food industries are being singled out for early consideration. Several of the beverage groups are most often mentioned. A small tax on coffee, a 10 percent levy on the retail price of carbonated beverages and certain other special taxes are currently mentioned about Washington. Some chain store taxation on a Federal basis is also talked. And the specter of processing taxes on agricultural materials again walks openly. An organized presentation of the food industries' side of these questions is going to be necessary early next year.

CONSIDER SUBSTITUTES — Smooth flow from abroad of numerous food raw materials cannot be assumed as at all certain. Everyone hopes that there will be no serious interruption in supply. But Washington fears that this ambition will not be realized for all classes of goods. It is being frequently suggested, therefore, that any division of industry now dependent on foreign supplies of raw material better consider what changes in formulas could be made if these normal sources of raw material were not regularly accessible to American shipping. This appears to be just "a word to the wise."

IF JAPAN MOVES SOUTH — During November the news reaching Washington indicates that the Japanese pressure on China is being relieved only to be applied farther south. This again seems to threaten the tin and rubber supply. Washington, therefore, constantly studies who can do without tinned containers. And regularly the conclusion is reached that many of the food industries will have to find other packaging materials after the reserves are used up if the free flow of tin is interrupted. There is nothing new in this idea except that it is constantly of greater importance to every user of tin containers.

PRIORITY RULINGS—The first official actions to assign priorities other than through voluntary industry cooperation affected machine tools. This means indirectly that equipment building may be slowed down. Those contemplating any plant expansion for food processing must take account of this fact. It is almost certain that new equipment and equipment parts will be procured with a little more difficulty, or after some longer-than-normal delays, in the not distant future. Executives and engineers of the food industry will have to take this fact into account in both their enlargement and modernization programs.

WILL DIETS SHIFT? — Washington is very busy trying to guess as many details as possible regarding the shift in diet as we have a million more men now serving in uniform than were so outfitted last year. Trade association and industry executives are discussing this question with the Army Quartermaster Corps. Many and varied guesses result.

Canners are particularly interested, both about canned vegetables and canned fruit. Estimates range from "no change" to "100 per cent increase." A mere average indicates that the per capita use of canned fruit may increase by about 4 percent and of canned vegetables about 6.5 percent. But those closest to the problem think that this arithmetic average is decidedly low.

Whatever the details may prove, there is one sure generalization. No division of the food industries is likely to experience any tremendous boom or tremendous collapse in demand. This conclusion is obvious when one realizes that less than 1 percent of the population is being shifted from its normal activity.

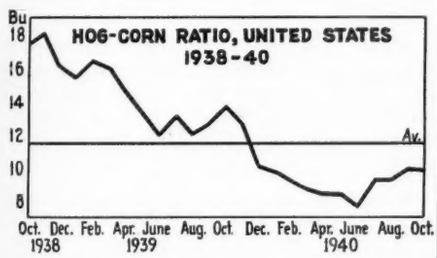
Pork Hits New High

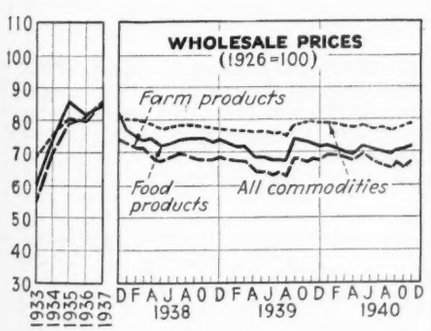
In spite of the fact that the supply of hogs for slaughter had been expected to be somewhat less in October than during the early months of this year, it was still large enough for October pork production to reach the highest figure ever recorded in that month, a total of 4,482,818 hogs being slaughtered. It is probable that pork production in October, 1940, was 25 percent above that of October, 1939, and 28 percent greater than the 1929–1933 October average. The month was also about 30 percent above September, 1940.

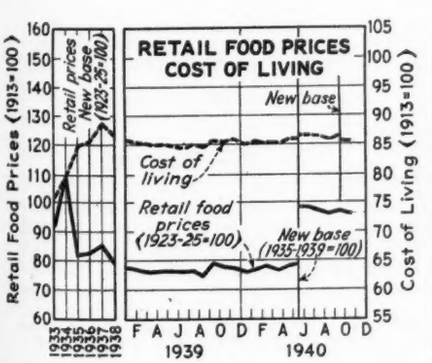
It is natural that, with this large pork supply, the higher pork prices established in August and September could not hold. While the average price of around $6.10 in mid-November was considerably above the $4.85 low hit on April 6, it was also considerably below the $6.83 high of September 7. In mid-November of 1939 the price was $6.37 per hundredweight.

Canned Food Prices Up

In spite of the sharply decreased exports of most canned foods, current prices have improved and greater price advances are likely. Primarily, this happy situation has come about because Nature has once more been kind to the canners and most important canned products, such as corn, tomatoes, peaches, and salmon, are not so abundant as in some recent years. When these moderate supplies are combined with expanded purchases caused by improved employment and army subsistence needs, prices should be favorable during the remainder of the current canning year.







Dairy Outlook for 1941

Three factors are important in the dairy outlook for 1941, according to the Agricultural Marketing Service:

1. A widespread tendency for farmers to increase the number of milk cows, under way for over two years and likely to continue;

2. Improved domestic consumption because of higher consumer income accompanying a higher level of business;

3. Improved exports of manufactured dairy products and reduced imports of foreign cheeses.

The level of milk production in 1941 is expected to be somewhat above the record output of 1940. However, improved demand is expected to maintain prices for dairy products at least at the 1940 level.

Commodity Prices Higher

Stimulated by the rising tide of defense business, with accompanying increases in employment and payrolls, commodity prices firmed in the month from mid-October to mid-November. Standing at 81.9 on November 16, the *New York Journal of Commerce's* weekly index of commodity prices showed an increase of 0.7 for four weeks, of 2.1 for six weeks, and passed the level of 1939 for the first time in months.

The same tendency was evident in grain prices, the same publication's index for which stood at 69.7 on November 16 compared to 67.0 on October 19th. However, according to this publication, food commodities in general did not respond in the same way, the index being 67.8 on November 16, compared to 69.0 on October 19, 1940.

Spot commodity prices in American markets showed the usual pattern of increases and decreases over the period from October 19 to November 16, 1940. Wheat, No. 2 dark winter, Kansas City, increased from 81½¢ to 84¢. Corn,

Data for the Charts

In preparing the curves shown on this and the succeeding page of Food Industries, data were obtained from the following sources: Prices received by farmers, U. S. Department of Agriculture; employment, payrolls, wholesale and retail prices, U. S. Department of Labor; cost of living, National Industrial Conference Board; commodity price index, *N. Y. Journal of Commerce;* business activity index, *Business Week;* hog-corn ratio, U. S. Department of Agriculture.

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No. 3 yellow, Chicago, increased from 65¼¢ to 66¼¢. Beef remained stationary at 17¢, while lamb increased from 14½¢ to 15½¢ and pork loins decreased from 18½¢ to 14½¢. Lard showed a rise from $5.20 to $5.35. Eggs increased from 22¢ to 23¢. Butter went up 10 percent, from 30½¢ to 33½¢. Cheese rose slightly, from 17¢ to 17¼¢. Canned food quotations were steady. Among the imported foods, sugar, raw, duty paid, upped from $2.78 to $2.90; coffee, Santos No. 4, increased slightly, from 6⅞¢ to 7¢; and cocoa jumped from $4.59 to $4.90.

INDICATORS

SWEET CORN canned in 1940, final figures of NCA, totaled 16,264,049 cases, compared to 15,290,580 cases in 1939.

LIMA BEAN PRODUCTION for freezing and canning has been re-estimated as 24,780 tons for 1940. This compares to a figure of 29,790 tons last year.

SNAP BEANS canned, frozen and processed in 1940 are estimated at a total of 99,770 tons, compared to 94,150 tons last year.

HOME CANNING has been increasing, if the 1,405,271,664 rubber jar rings sold in 1939 are an index. This figure shows an increase of around 37 percent over 1937 sales of rings.

EXPORTS of canned milk in September were about five times those of September, 1939.

ASPARAGUS canned in 1940 totaled 3,108,562 cases, compared to 2,519,892 cases in 1939.

SALES of confectionery and competitive chocolate products in September, 1940, were $30,931,000 for the 218 manufacturers reporting to the U. S. Department of Commerce. This was 1.7 percent over sales in September, 1939 and 49.3 percent above sales in August, 1940.

SUGAR DELIVERIES for consumption in the first nine months of 1940 were 5,125,438 short tons, raw value, compared to 5,547,249 tons for the same period of 1939.

LARD CONSUMPTION in the U. S. for the year ending September 30, 1940, reached a new high of 1,097,143,000 lb., compared to 927,970,000 lb. in the preceding year.

EGG PRODUCTION in October, 1940, was 2,215,000,000 eggs, the largest October production on record and 8 percent over the October, 1939, output.

MILK PRODUCTION per cow on November 1, 1940, was reported as about 4 percent higher than a year earlier and the highest on record for the date.

BUTTER, creamery, produced in September, 1940, was 144,205,000 lb., according to the Agricultural Marketing Service, compared to 132,260,000 lb. in September, 1939, and to a 1930–1938 average of 134,345,000 lb. for September.

CHEESE, American, produced in September, 1940, was 50,975,000 lb., a new high record for the month and 11 percent over September, 1939, production.

CHEESE, American, produced during the first nine months of 1940 was also a record for the period, at 468,390,000 lb.

OLEOMARGARINE SALES in September, 1940, as indicated by sales of internal revenue stamps, were 27,227,958 lb., compared to 30,805,486 lb. for the same month a year before.

PRETZEL OUTPUT in 1939 is reported at 23,644 tons by the Bureau of the Census.

FLOUR OUTPUT by mills producing 64 percent of U. S. production, as reported by *The Northwestern Miller*, was 6,492,266 bbl. in October, 1940, compared to 6,337,477 bbl. a year before.

APPLE OUTPUT in 1940 is expected to be 115,162,000 bu., compared to 143,085 bu. in 1939 and 109,595,000 bu. in 1938.

FRUITS, frozen, in storage on November 1, 1940, totaled 162,471,000 lb., compared to 142,387,000 lb. on November 1, 1939 and to a 1935–1939 average of 116,907,000 lb. for the date.

VEGETABLES, frozen, in storage on November 1, 1940, were 83,871,000 lb., compared to 76,920,000 lb. a year before.

BUTTER, creamery, in storage on November 1, 1940, amounted to 104,673,000 lb., compared to 128,111,000 lb. on November 1, 1939 and to an average of 129,515,000 lb. for the date in 1935–1939.

CHEESE, all kinds, in storage on November 1, 1940, amounted to 143,640,000 lb., compared to 114,736,000 lb. on November 1, 1939, and to a 1935–1939 average of 118,077,000 lb. for the date.

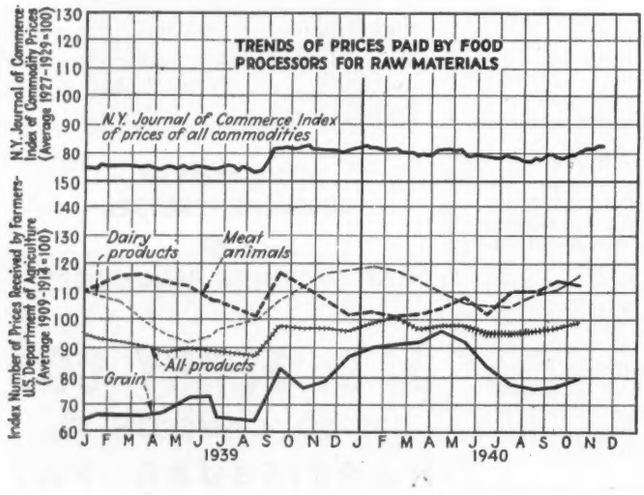
EGGS, case equivalent, in storage on November 1, 1940, totaled 7,343,000 cases, compared to 6,498,000 cases a year before and to an average of 6,942,000 cases for the same date in 1935–1939.

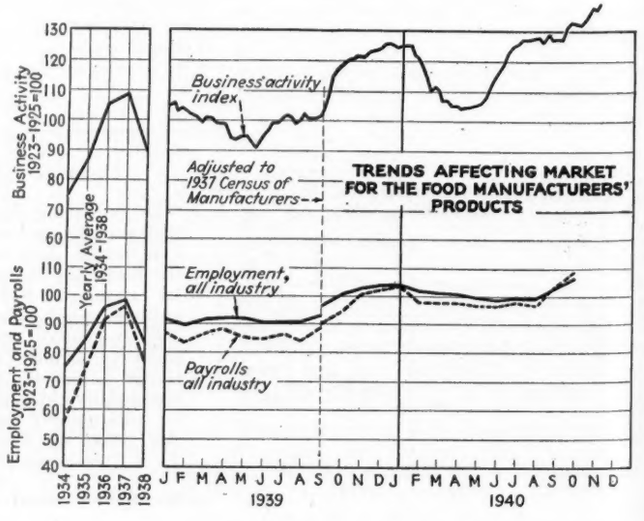
POULTRY, frozen, all kinds, in storage on November 1 of this year was 114,625,000 lb., compared to 79,228,000 lb. a year before and to an average of 78,255,000 lb. for the same date in 1935–1939.

MEAT, all kinds, in cure and frozen storage on November 1, 1940, was 403,242,000 lb., compared to 382,915,000 lb. on November 1, 1939, and to a 1935–1939 average of 397,679,000 lb. for the date.

LARD IN STORAGE on November 1, 1940, was 222,259,000 lb. The quantity a year before was 68,738,000 lb., and the 1935–1939 average was 62,266,000 lb. for the date.

WEEKLY WHOLESALE Food Price Index of Dun & Bradstreet, Inc., registered $2.43 for Nov. 12, compared to $2.42 for the date in 1939 and $2.39 in 1938.


TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of Commodity Prices (Average 1927-1929=100)
N.Y. Journal of Commerce Index of prices of all commodities
Index Number of Prices Received by Farmers-U.S. Department of Agriculture (Average 1909-1914=100)
Dairy products
Meat animals
All products
Grain
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940


Business Activity 1923-1925=100
Yearly Average 1934-1938
Employment and Payrolls 1923-1925=100
1934 1935 1936 1937 1938
Business activity index
Adjusted to 1937 Census of Manufacturers
TRENDS AFFECTING MARKET FOR THE FOOD MANUFACTURERS' PRODUCTS
Employment, all industry
Payrolls all industry
J F M A M J J A S O N D J F M A M J J A S O N D
1939
1940

A.M.S. Standards

(*Continued from page* 59)

Grade A classification with respect to uniformity of size.

Under the factor "absence of defects," consideration is given to the absence of blotch, stain, black internal discoloration, scab, "slabs," poor peeling or trimming, insect or mechanical injury and extraneous material.

ISSUED, June 6, 1940.
EFFECTIVE, July 1, 1940.

CANNED CARROTS

(Tentative)

Canned carrots are the canned vegetables prepared from whole, succulent tender carrots of any yellow garden variety, by topping, thoroughly washing and properly peeling and trimming; may be packed with or without the addition of water or salt; and are sufficiently processed by heat to assure preservation of the product in hermetically sealed containers. Canned carrots may be whole, sliced, quartered, diced, shoestring or cut (unsymmetrical pieces not conforming to any of the above styles).

U.S. GRADE A or U.S. FANCY canned carrots possess a typical bright color ranging from Plate 9, L-7 to Plate 9, L-9; are practically uniform in size and symmetry; are practically free from defects; are tender and succulent; possess a normal carrot flavor; and score not less than 85 points.

U.S. GRADE C or U.S. STANDARD canned carrots possess a fairly bright color, not lighter than Plate 9, L-5, nor darker than Plate 9, K-11; are fairly uniform in size and symmetry; are fairly free from defects; are fairly tender; possess a normal carrot flavor; and score not less than 70 points.

OFF-GRADE (Substandard) canned carrots are carrots which fail to meet the requirements of the foregoing grades, or which score in the lowest subdivision with respect to any one of the grading factors hereinafter mentioned.

The maximum head space and the minimum drained weight allowable in the sizes commonly used in packing canned carrots are tabulated in the standards.

The grade of canned carrots may be ascertained by considering, in addition to the foregoing requirements, the following factors: Color (20 points), uniformity of size (20 points), absence of defects (25 points) and tenderness and texture (35 points).

Cut carrots shall not be scored in the Grade A classification with respect to uniformity of size.

Under the factor "absence of defects," consideration is given to defects such as blotch, stain, or internal discoloration, scab, poor trimming or peeling and pathological, insect or mechanical injury.

ISSUED, June 12, 1940.
EFFECTIVE, July 1, 1940.

CANNED TOMATOES

(Final)

The standards of identity, fill of container and quality for canned tomatoes, promulgated by the Secretary of Agriculture, under Sec. 401 of the Federal Food, Drug and Cosmetic Act of June 25, 1938, by orders issued July 14, 1939[2], and any revisions or amendments thereof or other standards hereafter promulgated, are hereby adopted for the purpose of these grades.

U.S. GRADE A[3] or U.S. FANCY canned tomatoes are tomatoes which have a drained weight of not less than 66 per cent of the capacity of the can of which 80 percent are whole or almost whole; are of good red color; are practically free from defects and possess a normal tomato flavor. None of the factors may score below any subdivision lettered A as hereinafter set forth.

U.S. GRADE B or U.S. EXTRA STANDARD canned tomatoes are tomatoes which have a drained weight of not less than 58 percent of the capacity of the can; consist in whole or in part of large pieces, with or without whole or almost whole tomatoes; are red in color; are reasonably free from defects; and possess a normal tomato flavor. None of the factors may score below any subdivision lettered B as hereinafter set forth.

U.S. GRADE C or U.S. STANDARD canned tomatoes are tomatoes which have a drained weight of not less than 50 percent of the capacity of the can; consist of small or large pieces, with or without whole or almost whole tomatoes; are fairly red in color; are fairly free from defects and possess a normal tomato flavor. None of the factors may score below any subdivision lettered C as hereinafter set forth.

SUBSTANDARD canned tomatoes are tomatoes which fail to meet the requirements of the fill of container standards promulgated under the Federal Food, Drug and Cosmetic Act of June 25, 1938.

"Capacity of can" means the weight of distilled water which the sealed container will hold at 68 deg. F.

These grades are so drawn that the value for each factor may be expressed numerically. The maximum score that may be given for each factor is: Drained weight, 25 points; wholeness, 25 points; color, 25 points; and absence of defects, 25 points.

The rating for drained weight shall be based on the percentage of tomato meat remaining on the screen after draining the sample for two minutes over a screen containing two meshes to the inch, the screen remaining in a slightly inclined position to facilitate the draining of the tomatoes:

Grade A if more than 66 percent of the tomatoes remains on the screen after draining as described above.

Grade B if 58 to 66 percent of the tomatoes remains on the screen.

Grade C if 50 to 58 percent of the tomatoes remains.

Grade D if the tomatoes fail to meet the requirements of Grade C.

The maximum head space and drained weights for commonly used cans are tabulated in the standards.

Rating for wholeness:

Grade A if at least 80 percent of the tomatoes are whole or almost whole. Tomatoes are considered "whole" if each unit consists of a peeled, cored tomato in which the coring has been done in such a manner that the rounded contour of the stem end is not destroyed and no seed cavity has been opened by trimming, and the general contour of the tomatoes has been preserved. Tomatoes are considered "almost whole" if they may be restored to their original shape as "whole" tomatoes, although they may be cracked or split somewhat.

Grade B if the tomatoes consist in whole or in part of large pieces with or without whole or almost whole tomatoes. A "large piece" is a piece weighing 2 oz. or more.

Grade C if the tomatoes consist of small or large pieces, with or without whole or almost whole tomatoes. "Small pieces" means pieces which have not passed through the screen during draining, as described under the factor of drained weight.

Grade D if the tomatoes fail to meet the requirements of Grade C.

Rating for color:

Grade A if the canned tomatoes have a uniformly good red color typical of the variety. "Good red color" means that the color of at least 90 percent of the surface areas of the tomatoes is as red as "tomato red"—Plate 3, I-12, and not more than 10 percent of the surface areas may show as much yellow as Plate 4. F-12.

Grade B if a good red color predominates but a few slightly undercolored surface areas are present. "Few slightly undercolored surface areas" means that not more than 50 percent of the surface areas may show less red than "tomato red," but not less red than that in the color produced by the blending of the Munsell color disks, as described below.

Grade C if red is the prodominating color but noticeably undercolored surface areas are present. The minimum score for this grade will be given when the color barely meets the following test:

After draining the tomatoes as prescribed under the factor "Drained Weight," cut out and segregate successively those portions of tomatoes of least redness until 50 percent of the drained weight has been segregated. Comminute the segregated portions to a uniform mixture without removing or breaking the seeds. Fill the comminuted tomatoes into a black container to a depth of at least one inch. Free the surface of air bubbles and remove or press below the surface all visible seeds. Compare the color of the mass in full diffused daylight or its equivalent with the blended color of combinations of the following concentric Munsell color disks of equal diameter or the color equivalents of such disks:

1. Red—Munsell 5R 2.6/13 (glossy finish).
2. Yellow—Munsell 2.5 YR 5/12 (glossy finish).
3. Black—Munsell N1 (glossy finish).
4. Gray—Munsell N4 (mat finish).

These disks are so placed that the area of disk (1) covers one-third or more of the circle, and the exposed area of disk (2) does not exceed that of disk (1). The exposed areas of disks (3) and (4) make up the remainder of the area of the circle without regard to the exact exposed area of each. The color equivalent to that produced by the spinning of the disks set in the above proportions approximates Plate 4, F-12.

Grade D if the tomatoes fail to meet the color requirements of Grade C.

The factor "absence of defects" deals with the degree of care exercised in the removal of extraneous material, skins of tomatoes, core material and tomato blemishes, which would ordinarily be removed in the careful preparation of tomatoes for culinary use.

ISSUED, August 17, 1940.
EFFECTIVE, April 1, 1941.

[2] See FOOD INDUSTRIES, September, 1939, page 497.

[3] Tomatoes meeting the requirements of this grade, if 95 percent of the drained tomatoes are whole or almost whole, will be certified as U. S. GRADE A (Whole). Ten percent tolerance in drained weight is permitted in U. S. GRADE A (Whole) tomatoes.

Men, Jobs & Companies

INDUSTRY

Boston (Mass.) Sausage & Provision Co. will make alterations to its plant at an estimated cost of $50,000.

California Packing Corp., San Francisco, is experimenting with the marketing of glass-packed pears, peaches and fruits for salads. The cap closures bear the "Del Monte" shield.

Campbell (Calif.) Cooperative Dehydrator will spend $35,000 on plant additions which will increase the daily capacity from 140 to 230 tons of fresh prunes.

Coca-Cola Bottling Co. of Boston will construct a modern bottling plant at Brighton, Mass., where it has purchased 121,000 sq.ft. of land.

Coca-Cola Bottling Works of Richmond, Va., has built a garage, which will house 167 automobiles, and a storage house as the first unit of its expansion program. Construction of the main buildings of the new plant will be started later.

Crystal Canneries, Inc., Crystal City, Tex., has increased its plant floor space to 15,000 sq.ft. and has added new equipment. Additional land has also been purchased to take care of future enlargements.

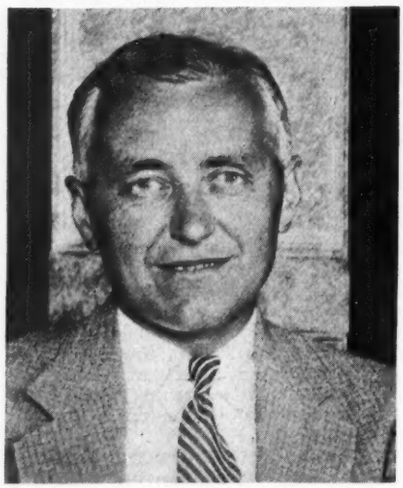
Goddard Bakery Co., Claremont, N. H., will build a three-story plant, 80 x 100 ft.

H. J. Heinz Co., Pittsburgh, will construct a vinegar plant at Berkeley, Calif., to cost more than $50,000 with equipment.

Henegar Bros., operator of several cheese plants in Tennessee, will operate a cheese plant in Athens, Ala.

Kraft Cheese Co., Chicago, has purchased land in San Francisco as part of a $750,000 expansion program for a new plant which will include general offices, factory, cold storage plant and garage. Kraft will also build a modern plant and distributing center at Elmira, N. Y.

Manhattan Brewing Co., Chicago, is building a 50 x 120 ft. addition to its engine room and is installing two new generators and an ice machine, to cost about $25,000.



J. E. McCONKIE

California Packing Corp., San Francisco, has named him research director to succeed Charles S. Ash, retired. Mr. McConkie was formerly assistant to manager of American Can Co. Research Laboratory, Maywood, Ill.

Minnesota Valley Canning Co., Le Sueur, has won a suit in the Federal Court for the Northern District of New York against Vincent Gambardella of Amsterdam, N. Y. The latter has been enjoined from advertising as "Niblets' Corn" or designating as "Niblets" any corn other than the genuine "Niblets" brand of corn, manufactured by the plaintiff.

National Dairy Products Corp., New York, has announced plans for a general refunding of its senior securities, consisting of its 3¾ percent debentures due in 1951, and its preferred stocks, through issuance of long term and serial debentures in an aggregate amount of $70,000,000.

Northwestern Yeast Co., Chicago, has named Lou Tregoning, a home economist, as its educational director in line with its program to restore breadmaking as an essential American home art. Miss Tregoning's duties will consist mainly of lecturing before girls' and women's groups on the ease of modern home baking.

Selma (Ala.) Bakery has moved into a new $50,000 plant, its second expansion since the firm was started four years ago.

Tyrell & Garth will double the capacity of its plant at Mission, Tex., bringing the daily output to 400 tons of processed grapefruit juice.

PERSONNEL

Gerald A. Fitzgerald, of General Foods Corp., New York, has been named chairman of the Division of Agricultural and Food Chemistry of the American Chemical Society.

J. P. Foohey has been made president

W. S. MORGAN **H. E. HAMILTON** **G. C. SPITZMILLER**

Best Foods, Inc., New York, has shifted some of its personnel, following the recent death of Herbert U. Brandreth, vice-president and general manager of the western division. Mr. Morgan, assistant treasurer, has succeeded Mr. Hamilton as secretary and treasurer. Mr. Hamilton has been elected vice-president and general manager of the central division with headquarters in Chicago. Mr. Spitzmiller, who was general manager of the central division, has been transferred to San Francisco as general manager of the western division. Arthur M. Clark has been named controller, a newly created position.

and general manager of Peter Eckrich & Sons, Inc., Kalamazoo, Mich.

Eugene Gzell has been appointed plant superintendent of Gimbal Candy Co., San Francisco. He was formerly production chief for Wallace & Co., Brooklyn, N. Y.

John Holzberlein, Grand Valley, Colo., has been elected president of American Honey Producers League. Lewis Parks, Watertown, Wis., was re-elected chairman of American Honey Institute.

Dr. A. A. Horvath, known for his work on soybean production and processing, has resigned as director of research, Horvath Laboratories, Chambersburg, Pa., to engage in independent consulting work with headquarters in Pittsburgh.

Gordon M. Ibbotson has been named Chicago representative for Wheatena Corp., Rahway, N. J.

Fred Irish has become factory superintendent of Bishop Candy Co., Los Angeles, a division of National Biscuit Co. He was formerly with Willard's Chocolates, Ltd., Toronto.

Ridgway Kennedy, Jr., of Abbotts Dairies, Inc., Philadelphia, has been named chairman of the Production and Laboratory Council of the International Association of Ice Cream Manufacturers.

Harry J. Krueger, Chicago, has been elected president of National Beer Wholesalers' Association.

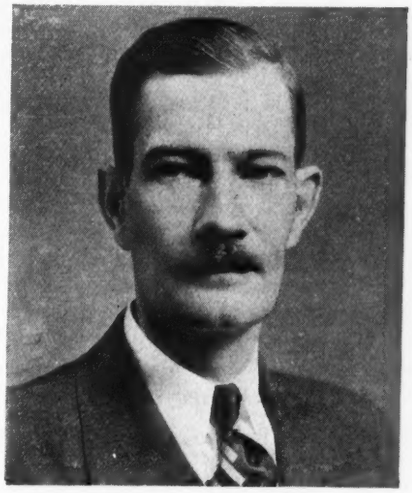
Kenneth W. Mawhorr, traffic manager of Mayflower Mills, Fort Wayne, Ind., has accepted a position with Soya Processing Co., Wooster, Ohio, as assistant to the president.

C. T. PAYTON

He has been advanced to president and general manager of Vegetable Oil Products Co., Inc., Wilmington, Calif. Mr. Payton was formerly secretary-treasurer.

George W. Mechling, vice-president and secretary of Lincoln (Neb.) Packing Co., has succeeded the late V. E. McArthur as president. George Swingle was named vice-president.

Frank A. Robbins has become a director and vice-president of Theonett & Co., Chicago. He was with Cudahy Packing Co., Chicago, as manager of the glue department and assistant manager of the byproducts department.



HAROLD F. CLARK

He has been appointed bacteriologist in the new research laboratory of Pillsbury Flour Mills Co., Minneapolis. Mr. Clark has been professor of bacteriology and biochemistry in the Kansas City College of Pharmacy. Dr. Edwin Hove, who has been engaged in a post-doctorate research fellowship in the Department of Biochemistry of the College of Agriculture, University of Wisconsin, has also joined the Pillsbury research staff.

J. W. Rudhard, former owner of "Maltop" and Toddy Corp., has organized Rudhard Products at Buffalo and will manufacture extracts.

A. F. Stobehn, general manager of the grain division of Montana Flour Mills Co., Great Falls, Mont., has been elected vice-president and assistant general manager of the company.

R. L. Ward, formerly with Swift & Co., has been named department manager in charge of provisions at Plankinton Packing Co., Milwaukee. He succeeds F. W. Gage, who has resigned to accept a similar position with Independent Packing Co., St. Louis.

DEATHS

Dr. Carl L. Alsberg, 63, director of the Giannini Foundation of Agricultural Economics at the University of California, former head of the Food Research Institute at Stanford University, and at one time a contributing editor of FOOD INDUSTRIES, Oct. 31, at Berkeley. He is credited with developing a new field of biochemistry in relation to foods. From 1912 to 1921 he was chief chemist of the Bureau of Chemistry of the Department of Agriculture.

William H. Baggs, 64, a director and former president of American Fruit Growers, Inc., Nov. 12, at Pittsburgh.

T. A. Currie, 78, one of the organizers of the company which later became the Florida Citrus Exchange, Oct. 16, at Winter Haven, Fla.

Henry J. Kaltenbach, 79, former vice-president of Fleischmann Co., Nov. 12, at New York. Mr. Kaltenbach was with the Fleischmann Co. for nearly 50 years until it was absorbed by Standard Brands, Inc. in 1930.

George L. Lauth, 68, one of the founders and first vice-president of Heil Packing Co., St. Louis, Nov. 1.

Roberdeau Annan McCormick, 83, who was vice-president of McCormick & Co., Inc., Baltimore, from 1891 to 1934, Nov. 18. His nephew, Charles P. McCormick, is president of the company.

Capt. George T. Phillips, one of the organizers and president of D. E. Foote & Co., Baltimore, Oct. 19.

ASSOCIATED INDUSTRIES

American Can Co., New York, reports the death of its president, Herbert A. Baker, 59, Nov. 25.

Association of Consulting Chemists and Chemical Engineers, Inc., New York, has elected Louis Weisberg president.

Edwal Laboratories, Inc., Chicago, has appointed as its chief chemist Dr. W. B. Hendrey, who worked on edible oils and edible soybean flour in his former position with Spencer Kellogg & Sons.

Food Research Laboratories, Inc., Long Island City, New York, has named Dr. Daniel Melnick chief chemist. Dr. Melnick was chief chemist of the vitamin research program at the University of Michigan.

Republic Steel Corp. has appointed as manager of commercial research, with headquarters in Cleveland, Donald R. G. Cowan, who was with Swift & Co. as chief statistician of its commercial research department.

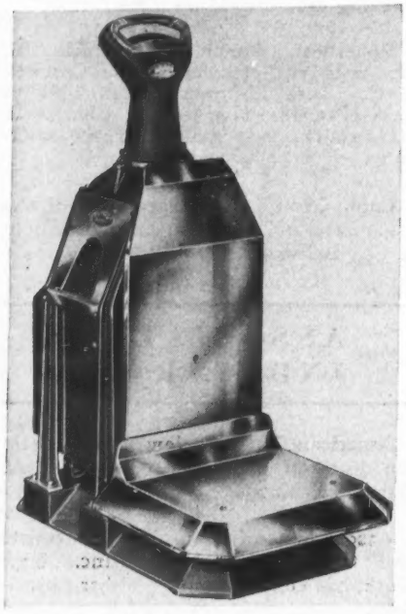
Sutherland Paper Co., Kalamazoo, Mich., has acquired the paper bottle manufacturing equipment of Purity Paper Vessels Co., Baltimore.

Food Equipment News

REVIEW OF FOOD PROCESSING EQUIPMENT, ACCESSORIES, AND SUPPLIES

Heavy-Duty Scale

AN OVER-AND-UNDER, even balanced scale of high capacity, but of portable design, has been developed by Exact Weight Scale Co., Columbus, Ohio. The scale is for use where predetermined weighing in a range from 40 to 160 lb. is desired. It is constructed of aluminum alloy and weighs, unloaded, 130 lb. Its low weighing platform is 6½ in. from the floor. For easy reading, the dial is inclined at an angle of 30 deg. and is 44 in. above the floor. The tower in which the dial is housed is arranged to be turned in any direction for the convenience of the operator. Each unit is equipped with carrying handles on each side for easy portability.



Portable over-and-under, even-balanced scale

Electric Lift

WALKER MFG. Co., Racine, Wis., has brought out a simplified industrial electric lift suitable for quick installation on the floor of any building. With a capacity of 7,500 lb., this lift will raise a load to any predetermined height up to 5 ft. It consists of 4 tubular steel posts and a steel platform which is raised and lowered by cables from an electric motor-driven drum assembly.

Installation is made by bolting the supporting posts to the floor. Two platform sizes are available: 6½ x 8 ft. or 6½ x 16 ft. The manufacturers recommend it for use in such operations as raising and lowering loads between trucks and shipping floors, lifting materials to machine-operating levels and for the elimination of ramps between manufacturing floor levels.

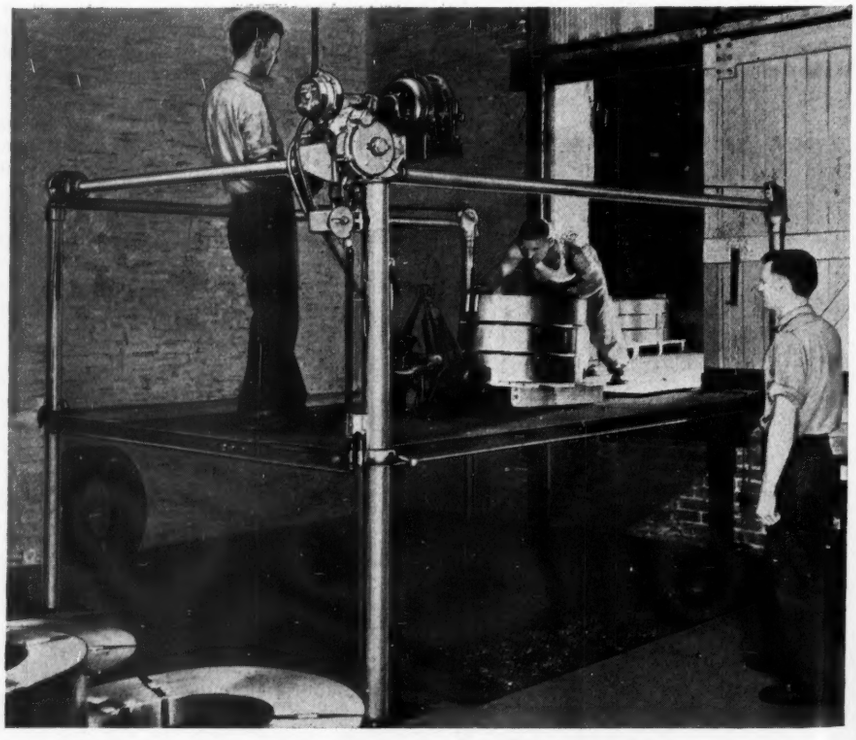
Monorail Conveyor Support

CLEVELAND TRAMRAIL DIV., Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a series of "Tramrail Arch Beams" for overhead materials handling systems for loads up to 5 tons. This series consists of three different sizes of beams as follows: No. 3000 which has a depth of 12 in. and a weight of 28 lb. per ft.; No. 3100 which has a depth of 12 in. and a weight of 33 lb. per ft; and No. 3200 which has a depth of 15 in. and a weight of 50 lb. per ft.

In design, this beam is a compound section consisting of a wide flanged T member to which is welded a specially rolled rail. The vertical member of this T section is arched at regular intervals in order to reduce weight without sacrificing strength. The wide top flange adds stiffness and prevents buckling of the beam even when used for very long spans with heavy loads. The manufacturers state that this beam can be used in handling installations where it would be inadvisable to use standard I-beams of even greater depths.

Ice Maker

CARRIER CORP., SYRACUSE, N. Y., is making a line of eight cabinet sizes of bulk ice makers ranging in capacity from 75 lb. to 1 ton of ice per day. The exterior of these cabinets is of 18-gage galvanized, copper-bearing steel. Metal-clad swing lids are equipped with anti-freeze gaskets to assure positive sealing but easy opening. For economical operation and



Simple electric lift for handling industrial loads.

How to avoid WRAPPER TROUBLE

Two things that cause wrapper trouble are *moisture* and *grease.* When you package meats, fish, butter, poultry and many other food products the wrappers are constantly being attacked—from ONE side by the grease and moisture in the *product*... from the OTHER side by the moisture in the *air.*

As the package moves from packing plant to the home it passes through many quick changes of temperature. This causes condensation of moisture on the wrapper. So—a wrapper MUST be both insoluble and grease-resisting. Patapar *is* both. When wet it is strong and sturdy. When it comes in contact with grease, it resists penetration. In addition, Patapar is boil-proof, odorless and tasteless.

How about letting Patapar answer your wrapper troubles?

PATAPAR is the paper for

Butter, Meats, Fish, Ham, Bacon, Sausage, Tamales, Ice Cream, Milk, Cheese, Poultry, Asparagus, Celery

and many other products

Paterson Parchment Paper Company

Headquarters for Genuine Vegetable Parchment since 1885

Bristol, Pennsylvania

West Coast Plant: 340 Bryant Street, San Francisco, California

Branch Offices: 120 Broadway, New York, N.Y. • 111 W. Washington St., Chicago, Ill.

Patapar Vegetable Parchment

Reg. U.S. Pat. Off.

Insoluble • Grease-Resisting • Odorless

proper temperature control, these cabinets are equipped with automatic expansion valves and thermostatic controls. The ice-freezing cans are of tapered design for easy removal of the ice and are made of heavy galvanized steel, coated on the outside with brine resistant paint. Refrigeration is provided by condensing units.

Meat Grinder

JOHN E. SMITH'S SONS Co., 50 Broadway, Buffalo, N. Y., has brought out the Buffalo 78-B helical gear drive grinder for meat products. This is a high capacity grinder said by the manufacturers to embody many new features. It has a long barrel-like cylinder with an extra large opening in order to accommodate large chunks of meat without trimming. The feed screw which propels the meat to the knife and plate has its openings and leads so balanced that the meat can be cut directly through a $\frac{1}{8}$-in. hole plate without mashing, churning or heating. The capacity of the grinder varies from 12,000 to 15,000 lb. of meat per hour.

It is claimed by the manufacturers that a major reason for the high capacity secured is the helical gear power transmission system embodied in this grinder. The motor is mounted directly on the bed plate of the machine and drives the gearing through a flexible clutch. The helical cut gears operate in an oil bath with a splash lubricating system which automatically oils all of the gears and the Timken bearings in addition. The lead screw is provided with an extra heavy Timken thrust bearing. All bearings have been made adjustable to compensate wear.

To guard against lubrication failure, the device is provided with a "one-point" transparent oiler. As long as oil shows in this unbreakable container, the operator knows that lubricant is being fed to the mechanism. This lubricated gearing system is said to be exceptionally quiet in operation and to assure a smooth transfer of power to the feed screw, avoiding any surging or stalling. Motors provided with the unit are 25 or 40 hp, depending upon the type of grinding service.

Proofing Cabinet

DESPATCH OVEN Co., Minneapolis, Minn., has brought out the Despatch-Bailey all-metal proofing and fermentation cabinet. This device is constructed of a 22-gage "Galvannel" double walls with 1 in. of insulation between. All joints are soldered and watertight. The front of the cabinet is equipped with six right-hand swing doors provided with double glass windows set in rubber and door hinges of the piano type. In the roof are two plug doors permitting access to the heating chamber and the humidifying chamber and to the cooling chamber.

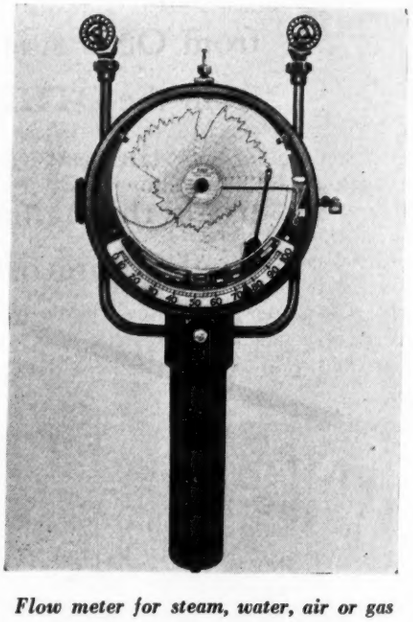
Heating is supplied by a 400 watt open coil and humidity is supplied by a Walton humidifier in the upper portion of the cabinet. Cooling is by means of a cooling chamber, also in the upper portion of the cabinet, provided either with freezing coils or ice pans. Circulation is by means of a fan driven by a 1/20 hp. motor. Automatic temperature control is provided, while air circulation control is by means of hand operated louvres.

Explosion-proof Switch

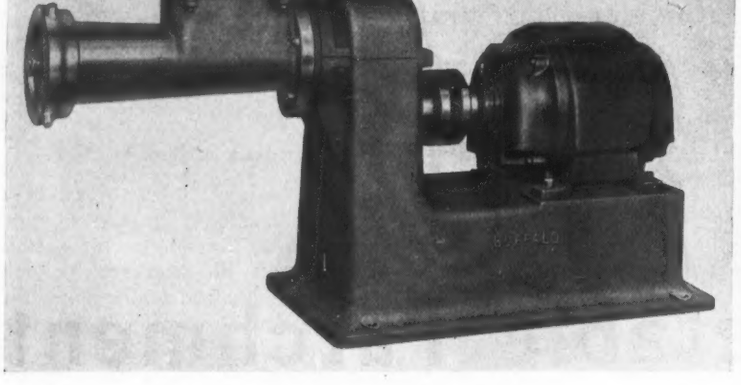
MICRO-SWITCH CORP., Freeport, Ill., have just brought out a small explosion-proof switch which is listed by the Underwriters Laboratories. This is particularly designed for use in explosive atmospheres such as occur in plants handling cereal products and similar materials. The explosion-proof housing is of complete dimensions—$3\frac{5}{8}$ x $2\frac{1}{2}$ x 2 in.—and is designed to make use of a regular micro-switch as the switching element. Types of actuation now available with this explosion-proof housing are the roller arm with the axis of the roller either parallel to or at right angles to the arm, and a bullet-nose push rod type. These switching units are available up to 600 volts alternating current and 1200 watts.

Flow Meter

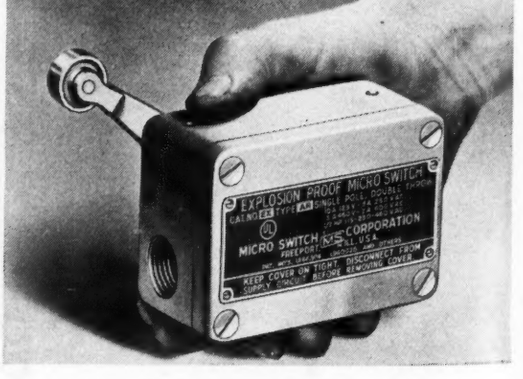
AMERICAN DISTRICT STEAM Co., North Tonawanda, N. Y., has developed a new design of flow meter operating on a free floating moving container principle. This meter operates in conjunction with an orifice plate in the pipe line and records the flow on a large, evenly divided chart, as shown in the illustration.



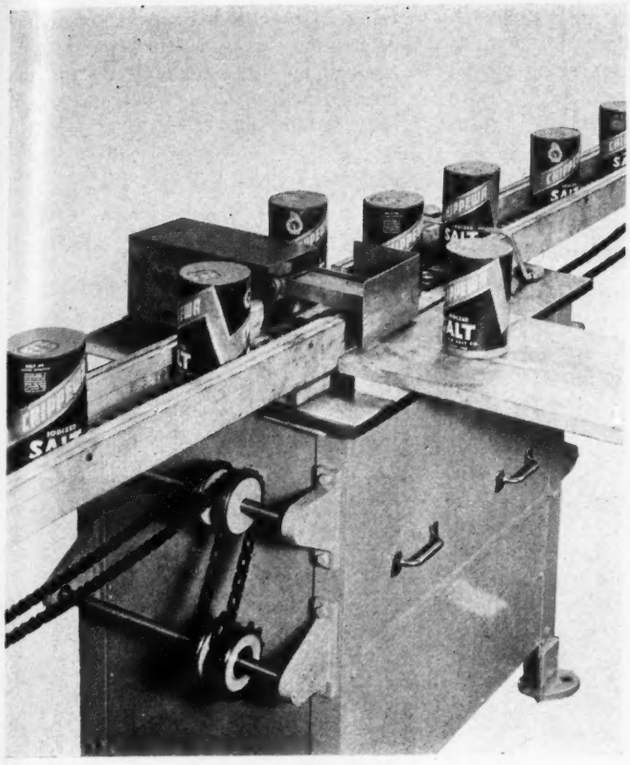
Flow meter for steam, water, air or gas



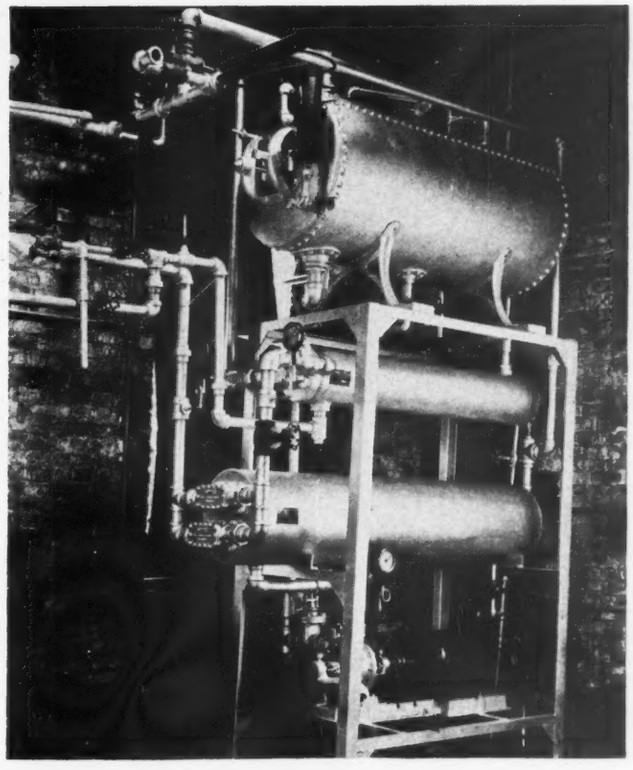
Meat grinder with helical gear drive.



Small switch with explosion-proof housing.



Under-weight ejector for packaging lines.



Trapless heat reclaiming system

The internal moving parts of the meter comprise a magnet attached to a mercury container suspended from a spring. A fixed, internally shaped bell surrounds the lower portion of the magnet and forms a seal with the mercury in the container beneath it. The movement of the container is directly proportional to the flow through the orifice and follower magnets in the external recording mechanism transmit the movement to a pen arm which records on the chart.

Chart and integrator mechanism are driven by a synchronous a. c. clock motor with capacity in excess of actual drive requirements. Integrating counters and illuminated indicating scales are fitted to this flow meter when desired. All charts and counters show the flow directly, and no factor need be applied to the reading to obtain the correct flow.

This new flow meter is offered in four types: (1) recording only, (2) recording and integrating, (3) indicating and recording, and (4) indicating, recording and integrating. In addition, an auxiliary pressure recorder can be fitted to any model to record the working pressure on the same chart as the flow.

Under-Weight Ejector

Fred Goat Co., 320 Dean St., Brooklyn, N. Y., has developed an automatic device for culling under-weight containers from a packaging line of the block link chain construction. The device consists of a check-weighing scale with a weight pan designed to fit into the conveyor line. The ejector train is driven by the slack side of the chain. During each cycle, the scale pan is first moved upwards, causing the container to be lifted free of the chain and while in this position the container is momentarily tested against a standard weight which is carried on a pan at the opposite end of the scale beam. At the end of this testing period, the scale pan is lowered until the container is replaced upon the moving chain. Containers which balance or overbalance the standard weight, when redeposited upon the chain, travel straight along the conveyor without interruption. However, if the container is of insufficient weight to balance the standard, the ejector pusher is automatically activated and shoves the container off of the conveyor and out of the packaging line.

This underweight ejector is so designed that after installation in the packaging line, it can be thrown in or out of operation by means of a clutch handle. The capacity is 60 or more containers per minute, depending upon the gross weight of the container and the minimum of short weight necessary to cause rejection. Increasing the speed or the gross weight tends to increase the necessary short weight, whereas more accurate operation can be obtained by either decreasing the speed or gross weight.

Trapless Heat Reclaiming System

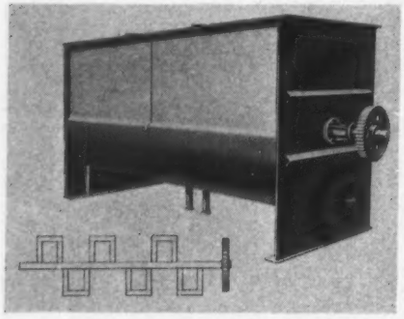
Fred H. Schaub Engineering Co., 325 W. Huron St., Chicago, has developed a condensation reclaiming system for use with heating apparatus such as coils, exhaust boxes, etc. The feature of this system lies in the substitution of specially designed orifice valves to drain the steam-heated equipment in place of the conventionally used individual steam trap. The manufacturer claims that in this way, higher and more uniform temperatures can be maintained, because of the continuous uninterrupted drainage from the orifice valve.

The system is completely vented. The high flash that would ordinarily occur in this method of drainage into an open return line is eliminated by a method of heat exchange which transfers the flash heat to the feedwater on the way to the boiler. Or, in plants where byproduct heat can be used for such purposes as the heating of hot water, the flash heat can be diverted for this purpose.

The manufacturer claims that this system is completely automatic in recovering low and high pressure condensates and heating returns, in adding the necessary amount of make-up water for boiler feed and in maintaining a uniform boiler water level.

Jacketed Mixer for Sirups

L. O. KOVEN & BRO., Inc., Jersey City, N. J., has developed a jacketed mixer for sirup. This is for use with such ingredients as chocolate liquors where the application of heat is necessary in order to carry out the mixing.



Jacketed mixer for sirups.

It is designed to effect speedy dispersion and solution of the mixed ingredients in comparatively large quantities. However, the same mixer can be used where cooling is desired during the mixing operation, by using the jacket for some cooling medium in place of steam or hot water.

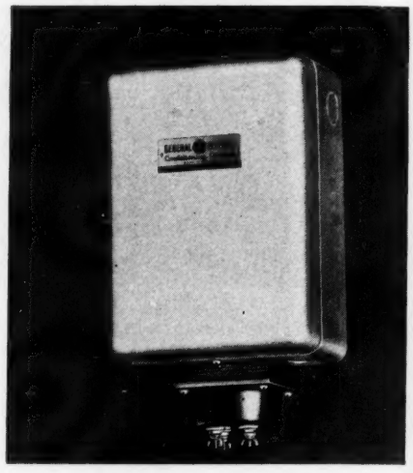
In construction, the mixer is of welded steel with an outer jacket covering the lower half of the cylindrical-bottomed tank. An agitator, consisting of a central shaft carrying six U-shaped paddles in alternate locations along the shaft, is provided. This agitator is arranged for drive through an external gear.

Lubricating Device

FOR LUBRICATION WORK for small truck fleets, or as an auxiliary on large truck fleet maintenance, and for lubricating industrial equipment, Alemite Division, Stewart Warner Corporation, Chicago, Ill., has brought out a low-pressure volume delivery foot gun known as Model 6697-A. This gun has a capacity of 25 lb. and pumps approximately 1 cu. in. of grease per stroke. Maximum pressure when operated by foot power is 5,000 lb. When operated by hand power, the pressure developed is lower —only 3,000 lb. This latter pressure is suitable for light bearings and the pressure developed by foot operation is for the tighter bearing. A 7-ft. hose, delivering 1 oz. of lubricant to every three strokes is supplied with the gun. The device weighs 30 lb. and stands 19⅝ in. high. It can be easily transported from one point to another as needed for lubrication operation. It is particularly recommended by the manufacturers for the lubrication of trucks with big wheel bearing and universal joint capacity and for the lubrication of gear boxes on industrial equipment.

Air Conditioning Control

GENERAL ELECTRIC CO., Schenectady, N. Y., has announced a new selector control for maintaining constant temperature, humidification, or dehumidification in processing air conditioning. This new selector control, when used with a 3-wire "floating"



Air conditioning controller

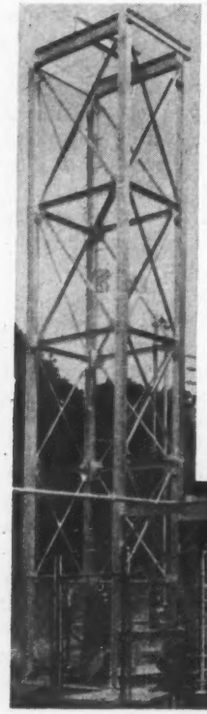
type thermostat or humidistat, provides close control of temperature or humidity under widely varying conditions. Features of the control include a synchronous timing motor to assure accurate timing, control relays for single-pole double-throw switches, conveniently located high and low voltage terminals and an aluminum finished case.

Motor-Operated Sanitary Valve

BARBER-COLMAN CO., Rockford, Ill., has developed a valve of the sanitary type which is motor-operated.

Sanitary features including the rising stem design, body of nickel alloy with stainless steel disk and stem, and valve end threaded for standard bevel seat sanitary fittings. These valves have no internal threads and are machined and polished inside to eliminate all pockets where food ingredients might lodge and spoil. A simple rubber seal ring, supported by a ported diaphragm and compressed by the bonnet nut is used around the valve stem. The entire assembly is designed to be easily taken apart for cleaning.

The motor operator is of high voltage heavy-duty type, and is equipped with a tight-fitting metal cover to pro-



"INSTALLED IN 1932, This STERLING Turbine Pump IN PERFECT CONDITION TODAY!"

Read This Excerpt From a Letter of J. L. Biddle, Supt. of Maintenance, WESTVACO CHLORINE PRODUCTS, INC.

"WE installed the first Sterling Turbine Pump in 1932 at 500′ setting. This pump has been in continuous service since that date except when we pulled the well to inspect the pump and lower pump to 700′ setting. On May 26, this year (1936), we again pulled this pump to inspect it, and again found it to be in perfect shape.

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Such a statement by a man of authority who has no personal axe to grind should mean much to you who seek long-lived, trouble-free pump operation. Write for full details, catalogs and prices—today.

● Few sterling Pump owners need service—but if you need it, Sterling offers the highest class of service from coast to coast.

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STERLING PUMP CORP.
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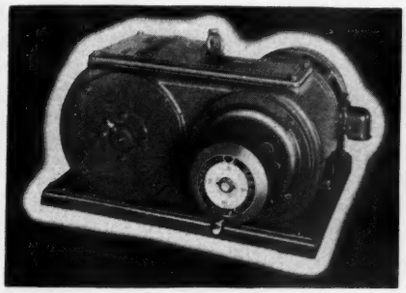
tect the working parts. A packing gland around the orifice in the case where the plunger enters prevents water or steam from entering through the base of the case. This motor operator is attached to the valve by means of a mounting yoke which is arranged for bracket support while the valve body is removed for cleaning.

These valves are supplied in 2 in. size, for 8, 15 and 35 sec. timing per stroke and for 150 and 220 volts, with pressure differentials of 10, 40 and 70 lb. The manufacturer recommends them for the control of the flow of milk, wort, food acids, vegetable juices, fruit juices and food ingredients.

Speed Indicator

REEVES PULLEY Co., Columbus, Ind., has developed a handwheel speed indicator for use with its variable speed transmission, Vari-Speed motor pulley and Motodrive. This equipment,



Indicator for variable speed transmission

known as the "Speedial", is said to indicate accurately the speed setting of the different units. The actual indication is a definite number of turns of the speed shifting screw of the unit. For each full turn of the shifting screw, the indicator pointer registers one point or degree on the circular scale shown in the illustration.

Push Button Station

GENERAL ELECTRIC Co., Schenectady, N. Y., has brought out a line of one- and two-button standard duty push-button stations. These are general-purpose devices offered for improving operation, appearance and ease of installation. They are protected from accidental operation by guard rings. The words "start" and "stop" molded on the front of the button, are filled with white paint for easy readability. The new stations are $4\frac{9}{16}$ in. high, $2\frac{5}{8}$ in. wide, and $2\frac{1}{2}$ in. deep. The station enclosure is made entirely of steel and consists of a front cover and a back. The cover is crimped over on the ends to overlap the top and bottom ends of the back, and is held in place by screws at top and bottom. The $\frac{7}{8}$ in. molded buttons are made slightly concave for convenience.

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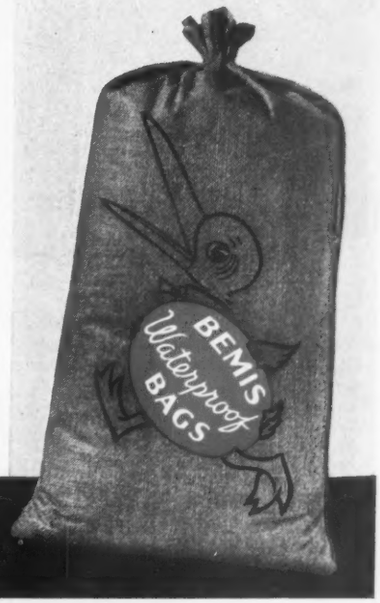

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Britain Fortifies Its Foods

(*Continued from page* 38)

at War," a number of scientists, anonymous but vouched for by the highly respectable firm of publishers issuing the work, suggested that "the minimum daily requirement of each of the ten or so more important vitamins, together with a few important minerals (such as calcium, iron and a trace of copper), could easily be incorporated in a biscuit which would be distributed free or at a very low price to the whole population. The annual cost would be less than £2,000,000, and the saving in health and efficiency immeasurable. This figure of £2,000,000 should be contrasted with the vast sum (approximately £50,000,000) that is being spent in subsidising British agriculture to an extent that is inadequate to provide these vitamins."

The addition of calcium is also of considerable interest, since calcium is not normally an important constituent of bread, and most of the calcium intake of the average man comes from other sources. A precedent has thus been set for the introduction of iron—a mineral in which the average British diet is extremely deficient—and other minerals not normally contained in bread.

On the purely organizational side, plans are being prepared for the more economic distribution of bread. It is understood that these will be on lines similar to those already proved successful in the dairy industry, where, under heavy government pressure, the trade is now busily working out a "one-roundsman, one-street" program, and exchanging customers between themselves to ensure this.

Filters

(*Continued from page* 49)

ters (Fig. 7) with capillary pores so fine that bacteria cannot pass through them. Such bacteria-proof filters may revolutionize the beverage industry of the future. They make it possible to sterilize beverages at room temperature. The basic idea of cold sterilization by ultra-filtration is well known. Berkefeld prepared earthenware membranes for this purpose many years ago. Seitz "E.K." filters have been in commercial use for some time for the elimination of yeast and mold from fruit juices and from wines.

The various closed filters differ from each other mainly in the shape of the filtering area, the appliances for removing caked sediment and the equipment for introducing the fluid mixture and removing the filtrate. Filters are equipped with heating or cooling devices whenever the temperature of the fluid at the moment of filtration is of critical importance. There are numerous special designs of filters, the literature being voluminous and the patent art being highly developed. Chart 1 compares the various types of closed filters.

Job Determines Filter Design

No one filtering medium or filter aid or filtering apparatus can serve all purposes. Any particular design will be good or bad depending upon the particular material to be filtered and the other conditions involved. Generalities are unwarranted, for each case is an individual problem. Recommendations should be made only after careful study of all the factors involved by a person having thorough knowledge of the nature of the material being filtered and the problems of the particular industry. Thus a procedure that might be admirably adapted to fruit juices might be entirely unsatisfactory in the other food industries, and might involve unnecessary taxes and restrictions in the alcoholic beverage industry.

See HTH PRODUCTS*

Slash Spoilage Losses, Guard Purity

1. More and more dairy plants are guarding the quality of their product "from cow to consumer" by placing in the hands of their milk producers a dependable sterilizer like Lo-Bax or HTH-15. Both these products are so low in cost and easy to use that producers can apply effective bactericidal treatment freely to milking machines, surface coolers, pails, cans, strainers, etc.

2. Distilleries have found HTH Products valuable in disinfecting fermenting vats and other equipment; wineries use these dependable sterilizers in keeping tanks sweet and in general deodorizing and disinfecting around the plant. Just as in other branches of the food industries, HTH Products do an effective job of bacteria control — quickly, economically.

3. A safe water supply is vital to most food plants and is often a problem for those having to depend on wells or other water sources of their own. HTH Products contain available chlorine in convenient dry form and may often be the answer to water treating problems of this sort just as for the destruction of algae in condenser water, the disinfection of cooling water in canneries, etc.

● In beverage plants and food plants alike, that silent thief, bacterial contamination, may cause serious financial loss unless effective means are found to keep this menace in check.

HTH Products have proved their efficiency as practical, dependable germ-killers in hundreds of food and beverage plants.

HTH Products are chlorine sterilizers in powder form—convenient to use, always full strength. Their action is quick and dependably effective. You just add them to water — they make germicidal hypochlorite solutions of the strengths needed to flush or spray any surfaces with which your food or beverage products come in contact. HTH Products are so economical you can use them freely throughout the plant.

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Food Technology

NEW DISCOVERIES & INVENTIONS

BAKING

Ethylene Matures Wheat Rapidly

EXPOSURE of freshly combine-harvested wheat to an atmosphere of one part of ethylene in 1,000 parts of air at room temperature for three days accelerates the natural ripening process ordinarily taking place during storage or "sweating" in the field. If practicable under commercial conditions, this treatment may render wheat suitable for bread making immediately after threshing.

Bread baked from ethylene-treated fresh wheat was excellent in texture and color and apparently normal in all respects, whereas the loaves from untreated wheat were smaller in volume, soggy and greenish in color. After about one month's storage, the untreated wheat gradually attained the same baking characteristics displayed after three days by the wheat exposed to ethylene.

The maturing effect of the ethylene is evidently exerted on the grain, and not on the flour, as flour from untreated wheat continued to produce poor bread after having been exposed to a 1:1,000 ethylene atmosphere. Low concentrations of ethylene appear to increase the viability of the wheat, as expressed by its germinating capacity, but more gas is decidedly harmful. There is no evidence of accelerated metabolism.

Digest from "The Effect of Ethylene on Freshly Harvested Wheat," by A. K. Balls and W. S. Hale, *Cereal Chemistry* **17**, 490, 1940.

The Case for Fine Flours

DOUGHS from two flours, one coarser than the other, were tested on a small Chopin extensometer to ascertain the influence of fineness on baking quality. Both flours were from a French wheat, "Hybride de la paix." One was sifted through No. 100 silk bolting cloth (much used for commercial flours), the other through a No. 55 wire sieve.

The extensibility of the finer flour was 28 mm. as compared with 37 mm. for the coarser flour. This is a particularly important property of dough since it governs the amount of water to be added to the dough. The swelling index was 11 in dough from fine flour and 8 in dough from coarse flour. Work of deformation was approximately the same (91.8 in fine flour dough, 92 in coarse flour dough). Physically the fine flour has more uniform particle size and offers direct contact of every particle with water, whereas the coarser flour contains large heterogeneous particles, including starch aggregates which are broken up in the finer flour. These factors contribute to the superior baking quality of fine flour.

Digest from "Relations Between Particle Size in Flour and Dough Properties," by Kuo-Chun Chin, *Comptes rendus de l'Academie des Sciences* **210**, 581, 1940 (Published in France).

BEVERAGES

Problems of Concentrating Fruit Juice

IN CONCENTRATING grape juice by vacuum evaporation the specific gravity should be raised to 36 or 37 deg. Baumé. At this specific gravity the concentrate keeps well; at lower gravities it is too readily fermentable. Composition does not change in direct proportion to the decrease in volume because some components (e.g., malic acid) decompose during evaporation and others (e.g., tartar) become insoluble and form a solid precipitate.

Concentrates for wine should be acidified when diluted for fermentation, and dilution should leave the juice richer than the original. Concentrates for beverage grape juice are likely to be too sweet for the consumer's taste, or not tart enough. This can be corrected by adding Seltzer water.

Grape juice concentrates can be stored in wood if the wood is well lacquered, or varnished with a Bakelite varnish. To prevent fermentation before evaporation, about 0.3 to 0.4 percent of sulphur dioxide may be added to the fresh juice, followed by an additional 0.6 percent the next day if the juice must be kept some weeks. Several suitable vacuum evaporators are described and illustrated.

Digest from "Concentrating Grape Juice," by E. Negre, *Progres agricole et viticole* **121**, 433, 448, 469; and **122**, 10, 1940 (Published in France).

DAIRY PRODUCTS

Cottage Cheese Grading

FROM more than 500 analyses of cottage cheese, over a period of more than ten years, it is evident that the fat content is related to the dry matter content. As fat content increases the dry matter content also increases. Under present quantity production methods, cottage cheeses should be graded as low-, medium- and high-fat products. The minimum dry matter content should be 20, 23 and 26 per cent respectively, but the actual content should always be at least 1 per cent above the stated minimum. Excessive watering should be scrupulously avoided. Thus, in making a medium-fat cottage cheese from curds and cream, no milk should be added since it would only serve to increase the water content unnecessarily.

Digest from "Water and Dry Matter Content of Cottage Cheese," by A. Schloemer, *Milchwirtschaftlishe Forschungen* **20**, 139, 1940 (Published in Germany).

Elasticity Of Emmenthaler Cheese

ELASTOMETRIC measurements made with specimens of Emmenthaler cheese revealed no relation to moisture content within the usual limits. Salt content has some influence, in that a high percentage of salt decreases elasticity, but no direct relation could be traced. The elastometer reading is influenced by pressure, and apparently there is an optimum pressure for indicating maximum elasticity. Chemical analysis did not reveal any factor of composition which could explain observed differences in elasticity. The temperature of the specimen has a pronounced influence on its elasticity.

In a separate study of reasons why eyes collapse in Emmenthaler cheese, there was again no apparent relation to composition. Collapse of eyes is attributable to physical causes, influenced at least in part by the colloidal structure of the cheese.

Digest from "Study of Elasticity in Emmenthaler Cheese" and "Collapsing Eyes in Emmenthaler Cheese," by G. Koestler, *Landwirtschaftliches Jahrbuch der Schweiz*, **54**, 127, 195, 1940 (Published in Switzerland).

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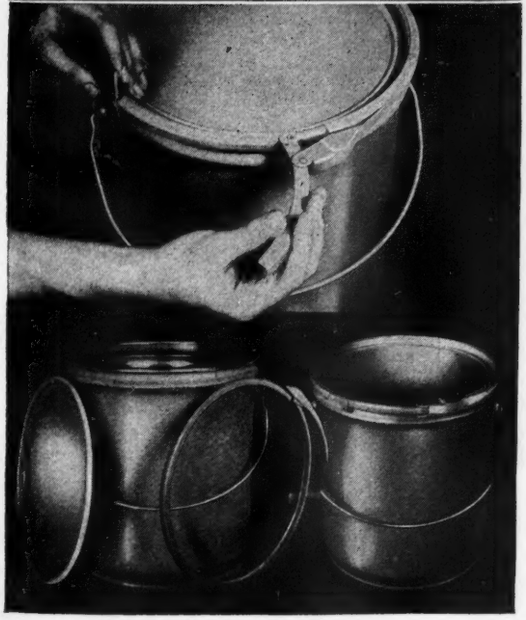

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Oxidized Flavor in Milk

NEARLY EVERY dairy chemist has his own pet theory of the cause of "oxidized" or "tallowy" flavor in milk. Adding traces of some metal salts produces it, copper being much more active than iron. These additions cause an increase in the oxidation-reduction potential of the milk (called Eh for short, similar to pH for hydrogen-ion concentration; an increase in Eh is an increased voltage, indicating a tendency to oxidation). If one part of copper (in the form of copper sulphate) is added to 2,000,000 parts of milk drawn from the cow not over six hours before, an increase of Eh of 0.01 volt or more in six hours is evidence that such raw milk will develop an oxidized flavor when stored 24 to 48 hours at 40 deg. F.

Milks vary considerably in their tendency to produce this flavor. This is attributed to a "poising" action, otherwise a resistance to a change in voltage, just like the "buffering" action indicates resistance to change in pH. Milk from cows on pasture is less likely to develop flavor than when they are on dry feed. Copper contamination before pasteurization is less serious than after.

Heating the milk sufficiently high prevents the flavor developing and causes a decrease in Eh, five or ten minutes at 158 or 185 deg. F. being more effective than 30 minutes at 145 deg. Bacterial growth likewise decreases Eh and prevents off flavor. Ascorbic acid (vitamin C), if added in sufficient amount (more than would normally be present in milk), prevents the flavor. Chemical reducing agents, such as hydroquinone, act similarly, and a *mild* oxidized flavor can be removed by enough of such a reducing agent as sodium sulphite. Several hours exposure to diffuse light has little effect, but direct sunlight rapidly causes off-flavor. Small amounts of oxidizing agents produce tallowy flavor, but with larger amounts it cannot be tasted. Hence, possibly the flavor is due to a mild oxidation of one of the minor constituents of milk which can be further oxidized to a tasteless substance. Increased acidity (by adding acid, not by allowing bacterial growth) increases the oxidized flavor.

Digest from "Variations in the Oxidation-reduction Potential as a Cause for the Oxidized Flavor in Milk," by George R. Greenbank. *Journal of Dairy Science* **23**, 725, 1940.

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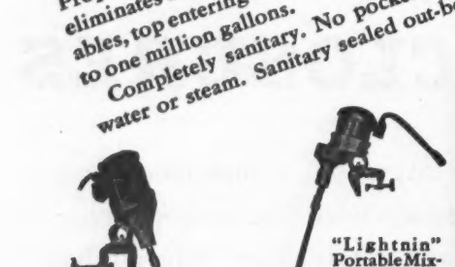

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CANNING

Thiourea to Prevent Browning Of Fruit Considered Safe

THE THIOUREA METHOD of preventing surface browning on cut fruits and vegetables was patented in 1937 (U.S. Patent 2,093,865, Sept. 21, 1937, to Frank E. Denny of the Boyce Thompson Institute for Plant Research, Yonkers, N. Y.). Fruits and vegetables for drying, cut fruit for salads, sliced potatoes and fruits for pies are successfully treated by dipping in water containing 0.05 percent thiourea. This process at once raises the question of possible thiourea poisoning. Experiments with sliced apples dipped in 0.05 percent thiourea solution showed about 30 p.p.m. (parts per million) of thiourea remaining on the fruit. A man weighing 165 lb., consuming 8 oz. of treated sliced apples, would ingest less than 10 milligrams of thiourea, or less than 1 p.p.m. calculated on his body weight.

These figures indicate that the potential hazard to consumers is small even if thiourea were toxic to man. Feeding tests were therefore carried out, first with animals and then with a human subject, to ascertain the actual toxicity of thiourea.

Tests with rats, rabbits and dogs showed no toxity until very large doses were reached, corresponding to about 24 oz. for a man weighing 165 lb. This dose is more than 100,000 times the amount ingested with 8 oz. of treated fruit. The test animals readily tolerated doses of thiourea far in excess of the amounts on treated fruits. One of the experimenters ate freely of apples treated with twice the necessary concentration of thiourea. He observed no loss of palatability in the fruit and experienced no discomfort. Thiourea is therefore considered entirely safe and harmless.

Digest from "Feeding Tests with Thiourea (Thiocarbamide)," by F. B. Flinn and J. M. Geary, and "Preliminary Feeding Tests with Thiourea," by Albert Hartzell, *Contributions from Boyce Thompson Institute* 11, 241 and 249, 1940.

FATS & OILS

Value of Lards for Deep Frying

THE PHYSICAL and chemical characteristics of lards and other fats in relation to their culinary value have been studied in recent years at the Agricultural Experiment Station, Iowa State College. Research bulletins have been issued covering three phases of this work. The third bulletin, reporting on the frying characteristics, has recently been issued.

The main purpose of this part of the study was to compare the frying life of lards and other fats when used under household conditions. Doughnuts and potato chips were cooked in the fats. Certain chemical and physical constants of the fats were determined before and after cooking to find the extent of change during their use. In addition, the amounts of fat absorbed by the doughnuts were recorded and an effort made to determine whether the degree of absorption was correlated with the chemical and physical characteristics, of these fats; and, if so, with which of these characteristics.

In another unit of the study doughnuts were cooked at three temperatures, and the extent of the chemical and physical changes in the fats, due to the temperatures employed, was determined. The doughnuts cooked at these three temperatures were also scored for palatability.

The work with potato chips constituted a minor portion of this study; most of the work with potatoes dealt with the time required for the sugar content to become small enough, after different low-temperature storage conditions, to obtain satisfactory chips.

On the basis of this work and the work reported in the first two bulletins of this series, recommendations for improvement of lards are made: (1) Lard should be more uniform in consistency, odor, performance and in chemical and physical constants. (2) A method of rendering lard should be developed which removes the objectionable odors. (3) If lard is sold by grades, the better grade should be of smooth consistency. (4) The smoke point of a frying fat should be high enough so that the fat does not smoke when it is used for short periods at a suitable frying temperature. (5) The free fatty acid content (as oleic acid) should be below 0.3 percent. (6) The peroxide value for each fat should be low. (7) The iodine value of a first-grade lard should be below 75.

This abstract is based on Research Bulletin 279, titled "The Physical and Chemical Characteristics of Lards and Other Fats in Relation to Their Culinary Value; Part III. For Frying Purposes," by Belle Lowe, P. Mabel Nelson, and J. H. Buchanan. Agricultural Experiment Station, Iowa State College, Ames, Iowa, September, 1940. Parts I and II of this study are, respectively, Research Bulletin 242 (October 1938), "Shortening Value in Pastry and Cookies," and Research Bulletin 255 (May 1939), "Use in Plain Cake."

Foaming of Frying Fats

TO DETERMINE the foaming characteristics of a number of commonly used frying oils and fats, a beaker-scale

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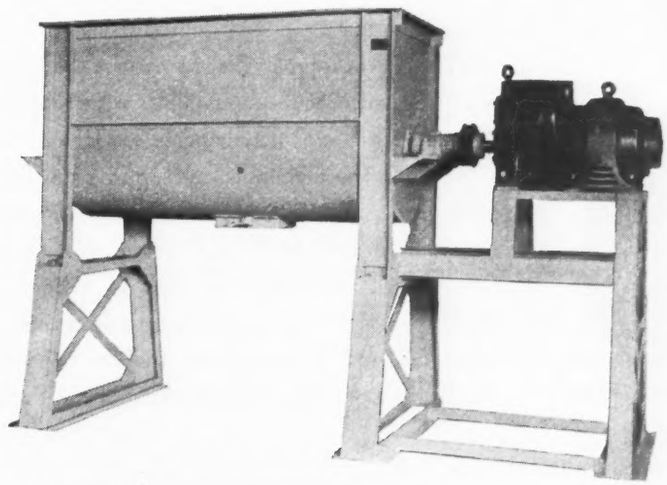

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test was developed in which water-soaked pieces of bread were used. "According to the method developed and used for studying the foaming tendencies of oil, it would seem that time and temperature are the main factors in the breakdown of an oil which causes it to foam. Hydrogenated oils have a greater resistance to foam than the original oils from which they were produced. Some mineral soaps have a tendency to retard foaming, and use of excess caustic in refining of oils is of some assistance in building up foam resistance. In general, it may be said that there is a fair correlation between the increase in the refractive index and viscosity of a shortening material and the tendency to foam. It was also noted that the shorter the time before foaming sets in, the greater the increase in free fatty acids. There was no tremendous difference found between any type of oil, as to resistance to foaming properties. Some animal fats which are not reported in this study were found to have a higher resistance to foaming than the vegetable oil materials. It would seem possible that in seasons when the fatty acid content of original oils is rather low, there may be a tendency for shortening materials produced therefrom to show a greater foaming tendency than in years when the use of larger amounts of caustic in refining is practiced."

Digest from "Studies Relating to Foaming Tendencies in Edible Oils and Fats," by H. E. Robinson, H. C. Black and H. S. Mitchell, *Oil & Soap*, September, 1940, page 208.

Vitamin E as an Antioxidant

ANIMAL FATS and oils, such as lard and cod liver oil, tend to become rancid easily. On the other hand, vegetable oils, like cottonseed and wheat-germ oils, may be stored for long periods of time and remain perfectly fresh and stable. The vegetable oils, but not the animal fats, are rich in vitamin E (tocopherol).

When vitamin E is isolated in its three pure forms (alpha, beta and gamma tocopherol) and added in small amounts to animal fats, it acts as a stabilizer (antioxidant) for these fats. That is, lard containing the vitamin remains fresh much longer than lard having no added vitamin E. Evidently, the presence of vitamin E and possibly other as yet unknown stabilizers in vegetable oils contributes to their excellent keeping qualities. When the vitamin is removed from the vegetable oils by various means, the recovered oil has the behavior of an animal fat.

Besides vitamin E (tocopherol), it has been established that polyphenolic compounds of known chemical structure are excellent stabilizers for fats

and oils. One of the most powerful of the phenolio antioxidants is hydroquinone. The tocopherols are chemically related to hydroquinones; their synthesis has been accomplished by combining substituted hydroquinones and phytol, on alcohol that is present in the chlorophyll molecule. The tocopherol molecule has a different and more complex ring structure (chroman ring) than that present in hydroquinone.

The aim of the present investigation was to study the antioxidant action of the pure synthetic forms of vitamin E and of a number of closely related but simpler compounds all of which contain the same or similar units of chemical structure (chroman and coumaran rings) as the vitamin.

It was found that synthetic vitamin E (tocopherol) had about the same stabilizing action on lard as the natural vitamin. The chroman ring structure was responsible for its antioxidant action. Synthetic chromans and coumarans of simpler chemical structure than the vitamin had even greater stabilizing action than the vitamin. Thus, the time required for a sample of lard containing 0.02 percent of one of these synthetic compounds to become rancid was 30 times that required for an unprotected sample of the fat. However, lard containing 0.02 percent of tocopherol lasted only two to three times as long as the unprotected sample.

The chromans and coumarans form a new and general class of antitoxidants for fats and oils. Vitamin E thus becomes one of a whole series of compounds having the same stabilizing properties. Further, they are found to possess a greater stabilizing effect than the hydroquinones from which they are prepared.

Digest from "The Antioxidant Properties of Vitamin E, Hydroxy Chromans, Hydroxy Coumarans, and Related Compounds," by Calvin Galumbic. A paper presented at the Detroit meeting of American Chemical Society, September, 1940.

SUGAR

Deammoniating Beet Juice

To TEST the effects of deammoniation on beet juice of the first saturation, the juice was reduced about one-tenth in volume by vacuum evaporation at 80 deg. C. About 80 to 90 percent of the total ammonia content was then removed. The resulting drop in alkalinity was equivalent to about 0.02 percent calcium oxide content, ranging from 0.016 to 0.023 percent in the analyses. Effects were then studied by evaporating and concentrating the juice in the usual way after the second saturation, and observing color, calcium salt content and quotients.

Darkening in color was only 18 to 36 percent in deammoniated juices as compared with 31 to 55 percent in juices from which ammonia was not removed. Deammoniation had no effect on the quotient, which remained the same as in juice given the same treatment without removing ammonia. The amount of calcium salts was from one-fourth to one-half greater in the deammoniated juice than in the other. There was some loss of alkalinity during the concentrating operation in deammoniated juice. This was easily compensated by adding enough sodium carbonate to make up the ammonia loss, but addition of soda increased color somewhat above the expected level. Juice in which alkalinity was made up by adding soda retained its normal content of calcium salts.

Digest from "Experimental Deammoniation of Juices of the First Saturation," by P. Pavlas, *Listy Cucrovar* 58, 144, 1940 (Published in Czechoslovakia).

Diffusion and Extraction Batteries

DIFFUSION RATES and extraction efficiency have been studied in a battery of sugar extractors on a semi-works scale. A new function was introduced in calculating the results, namely the concentration-distribution curve. This function was adapted to the study of systems operating with continuous contact between the phases in the extractions. It permits graphic determination of the degree of exhaustion attained in the extractors.

In experimental confirmation of theoretical predictions a battery of fourteen 10-liter extractors was employed. The test results showed that extraction efficiency depends particularly on avoiding stratification effects (zones of relatively incomplete contact) by controlling rate of flow, and on providing the most favorable concentration relations.

The diffusion coefficient depends on temperature, on the kinetics of phase contact (rate of flow, particle size, extractor shape and like factors) and on thoroughness of contact with the solvent. Efficiency losses due to the small number of extractors can be compensated to some extent by increasing the volume of liquid input. Hot water, while it overcomes losses due to low temperature, causes the load on successive units to vary considerably. Curve charts show the performance of continuous extraction as compared with a battery of extractors.

Digest from "Diffusion and Extraction Processes in a Battery of Extractors," by Ippolito Sorgato, *Chimica e P Industria* 22, 165, 1940 (Published in Italy).

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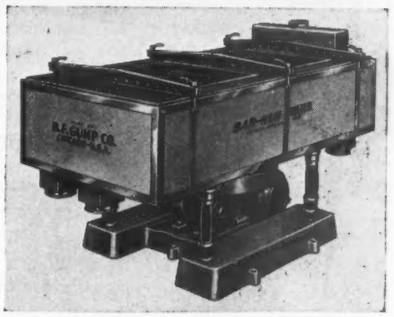

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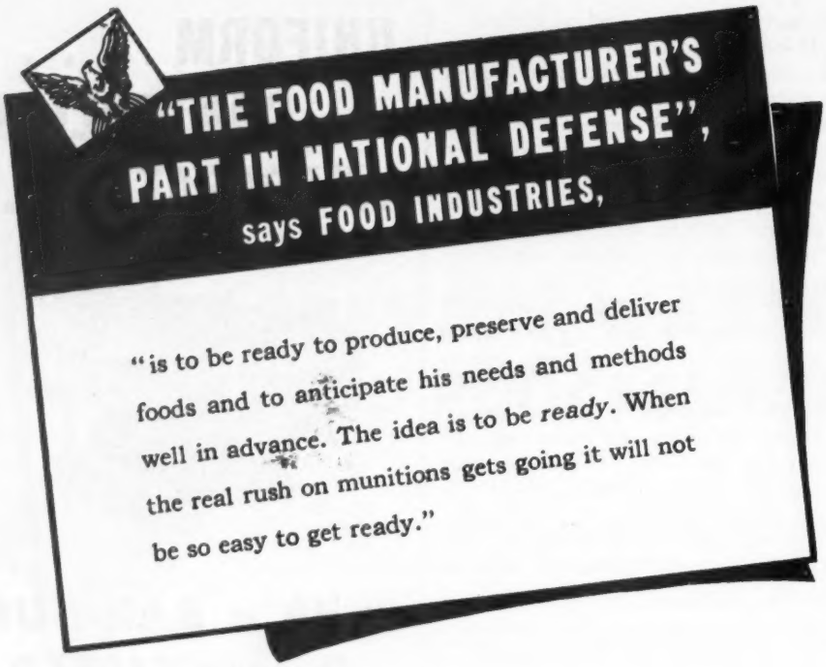
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FISH

Composition of Fresh and Salted Fish

CHEMICAL ANALYSES of salted flesh of pike, carp, gobie, perch, tench, bream, mackerel, sheatfish and other fish showed highest protein content in perch (28.6 percent) and lowest in bleak (20.4 percent). Perch ranked lowest in fat (1 percent), while mackerel (25.4 percent) was the fattest food fish among those analyzed in these tests.

In fresh fish the variability was not so great. Analysis of the edible portion showed the lowest protein content in bream (15.5 percent) and the highest in sheatfish (22.1 percent). Bream and mackerel were fattest (7.4 percent) while pike had least fat (0.6 percent).

Detailed analytical tables show the immediate portion of whole fish and the protein, fat, ash and moisture content of the edible portion for each kind of fish (fresh and salted). The fish taken for analysis were caught in August, long enough after the egg laying season for the fish to be in satisfactory edible condition.

Digest from "Chemical Composition of Fish Flesh," by I. Vintilescu, N. Stanciu and A. Opari. *Bulletin de la section scientifique, academie roumaine* **22**, 528, 1940 (Published in Roumania).

MISCELLANEOUS

Vitamins from Distillery Wastes

DRIED distillers' grains have hitherto been used chiefly in compounding dairy feeds. Recent chemical and biological assays, however, have shown that the dried solubles are a valuable source of the water-soluble vitamin B complex, especially riboflavin. The chick antidermatitis factor is another important component. Proper drum drying of the solubles prevents vitamin losses.

Dried screenings are low in vitamin content. Corn distillers' dried grains (screenings plus solubles) have some vitamin A potency but very little vitamin D potency. Extracting oil from distillers' grains lowers the vitamin A and chick antidermatitis potency but not the riboflavin and vitamin B_1 contents.

A new use for distillers' dried grains is suggested by these observations. Because of the high flavin content and the presence of other water-soluble vitamins from yeast, and the nutritional value of the dried grains, they are particularly useful in poultry feeds. They even effect a saving when used

to replace part of the dried milk.

Digest from "Vitamin Content of Distillers' By-Products," by C. S. Boruff, A. F. Langlykke and S. Black, *Industrial and Engineering Chemistry* **32**, 1237, 1940.

Vitamins From Oils by Pressing

MECHANICAL PRESSURE instead of solvent extraction is the means of recovering the vitamin content of fish and vegetable oils provided for in U.S. Patent No. 2,207,712.

Since the oils are usually of the unsaturated type, they are partially hydrogenated and then pressed in an atmosphere of CO_2, hydrogen or nitrogen gas. Through hydrogenation, the fluidity of the oils is reduced, upon solidification of the hydrogenated portion the fat soluble vitamins A, B and D are retained by the non-hydrogenated or liquid portion, and a high recovery of the vitamin content of the oil is made possible. By carrying on the operations in a relatively inert atmosphere, loss of the vitamin potency of the expressed oil through oxidation is reduced and deterioration of the residual oil itself is inhibited.

Reduction in production costs, increased recovery of the vitamin content of the oil, and improvement in flavor and stability of the vitamin concentrate are claimed for the mechanical method over the solvent method.

Granted to James G. Blaso, East Elmhurst, N. Y., the patent is assigned to Natural Vitamins Corp.

Bleaching Stained Oranges

ORANGES which have been stained by the fungus known to growers as "sooty blotch" are not effectively bleached by hyposulphite. The color fades, but reappears after the treatment. Hypochlorite gives an effective bleach but the solution loses strength rapidly. To meet the need for a stable bleach solution, experiments were carried out with acid stabilizers in hypochlorite solutions. Boric, citric and acetic acids were not sufficiently effective for practical purposes but hydrochloric acid proved to be a potent stabilizer at a certain optimum concentration (5 cc. of concentrated aqueous hydrochloric acid in 400 cc. of water containing 10 grams of chloride of lime). With 8 cc. instead, in the same solution a better bleach is obtained but the hypochlorite solution is much less stable. Experiments showed that an effective bleach solution is obtained either with boric acid and soda ash or with sodium bicarbonate (without boric acid) as a substitute for soda ash. The preferred quantity of sodium bicarbonate is 3.2 oz. per gallon. This solution, though equally effective, is less expensive than with boric acid and soda ash.

Digest from "Removal of Sooty Blotch From Oranges," by C. P. Naude, Bulletin No. 212, Department of Agriculture and Forestry, Union of South Africa; 13 pages; 1940.

Color in Potato Chips Controlled by Reducing Sugars

POTATOES do not always yield chips with the color expected by consumers. It has been supposed that total sugar content was the controlling factor, but tests have revealed that only the reducing sugars actually control color. This conclusion was confirmed by soaking filter paper in nonreducing or reducing sugar solutions and in starch suspensions, then cooking like potato chips. Reducing sugar content must be relatively low for satisfactory chip color since a high content causes too much browning. Tests with 11 varieties showed that Russet Rural potatoes are low in reducing sugar, often too low for satisfactory browning without excessively high cooking temperatures. Chippewa Carman 3, Irish Cobbler and Katahdin potatoes give good chip color under most conditions. Russet Burbank, Blue Victor, Early Ohio and Spaulding Rose are somewhat richer in reducing sugar and sometimes the chips are too brown. Bliss Triumph and Green Mountain are rich in reducing sugar and usually their chips are too brown.

Digest from "Factors for Color in Production of Potato Chips," by F. E. Denny and N. C. Thornton, *Contributions from Boyce Thompson Institute* **11**, 291, 1940.

Effect of Cooking on Eggs

DIGESTIBILITY TESTS with standard pepsin solution confirmed the accepted ideal that hard-boiled eggs are hardest to digest among cooked eggs, with poached, soft-boiled and lightly fried eggs ranking highest in digestibility.

Scrambling and poaching are wasteful as to utilization of egg protein, and frying becomes equally wasteful of protein value if too much heat is applied, as is commonly the case. Waste in frying is largely due to inability to estimate grease temperature accurately in the frying pan. Fresh eggs are superior to storage and preserved eggs, but waterglass preservation is well worth while for seasonal price economy since the loss in food value is relatively small. Eggs are more expensive than milk as a source of food, but cheaper than meat as a source of mineral salts and an excellent source of vitamin B.

Digest from "Effect of Cooking on Eggs," by Mary Andross, *Journal of the Society of Chemical Industry* **53**, 449, 1940 (Published in England).

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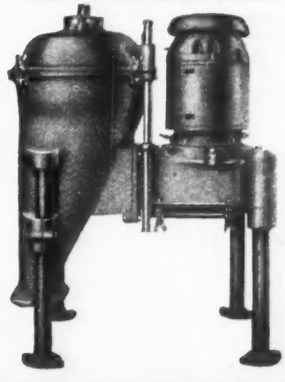

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Books

All About Vitamin B_1

THE STORY OF VITAMIN B_1. Revised edition. Published by Merck & Co., Inc. Rahway, N. J. 1940. 70 pages; 8½ x 11 in.; paper. Free to food technologists.

Food technologists concerned with vitamin fortification of a product, or with restoring a processed food to the vitamin B_1 level of the raw material, will find much useful information in this brochure. Written in a scientific vein, it discusses the isolation and synthesis of vitamin B_1, its properties and standards, its assay and units, its physiological action, its place in the diet and nutrition and the clinical manifestations and therapy of vitamin B_1 deficiency.

Kraut Quality Indicators

COMPOSITION OF CANNED SAUERKRAUT. By Carl S. Pederson. Published by New York Agricultural Experiment Station, Geneva, N.Y. 1940. 15 pages; 5¾ x 8¾ in.; paper.

Most food processors want to make a high grade product. But to do so they must know what constitutes high quality in their particular item. This bulletin will help kraut makers in that respect. It reveals the results of a study which has shown certain relationships, particularly between quality and salt, acid or vitamin C, and between the texture of kraut and salt content. No less than 332 samples of commercial canned kraut, from packers throughout the country, were studied.

Methods of Analysis

OFFICIAL AND TENTATIVE METHODS OF ANALYSIS OF THE ASSOCIATION OF OFFICIAL AGRICULTURAL CHEMISTS. Published by Association of Official Agricultural Chemists, P.O. Box 540, Benjamin Franklin Station, Washington, D. C. 1940. 757 pages; 6⅝x9½ in.; cloth. Price, $5.

Methods for analyzing some two dozen classes of food products are included in the material of this book. The instructions are specific, complete and official, and they are valuable in that they standardize the methods of analysis employed by those engaged in research and by those concerned with regulatory activities in the industry. This book is now in its fifth edition.

Economics of Whale Oil

WHALE OIL—An Economic Analysis. By Karl Brandt. Published by Food Research Institute, Stanford University, Calif. 1940. 264 pages; 6¼x9 in.; cloth. Price, $3.

As a nutritional and industrial fat, whale oil competes with butter, lard and vegetable fats. So this study contributes toward an understanding of the forces that determine the prices of all competitive fats and shape their supply and demand.

Of particular interest in the book are the chapters on the world's whale oil supplies; whaling costs and profits; the demand for whale oil; transport, storage and marketing; tariff duties; excise taxes and other protective measures; the price of whale oil; and the outlook for whale oil.

Navy Book on Refrigeration

INSTRUCTIONS FOR THE OPERATION AND MAINTENANCE OF REFRIGERATING PLANTS. Prepared by the U.S. Navy Department's Bureau of Engineering, 1940. 164 pages; 6x9¼ in., paper. Price, 30 cents; for sale by Superintendent of Documents, Washington, D.C.

Men in the food industries who are concerned with the operation of refrigerating equipment will find these instructions a practical aid in their work. Refrigerating equipment is described and the principles of refrigeration presented. But the information on how to operate a refrigerating system and how to shoot trouble in it is perhaps more important.

Consumer Grades, Labels

PRODUCTS STANDARDS AND LABELING FOR CONSUMERS. By Alice L. Edwards. Published by the Ronald Press Co., 15 E. 26th St., New York, N. Y. 1940. 134 pages; 6 x 8¾ in.; cloth. Price $2.50.

This book indicates the many groups interested in the establishing of standards and grading of consumer products and discusses the viewpoints and activities of each of these groups. It also discusses the steps and methods by which grades are established either when they are the result of voluntary cooperation between the various interested groups or the result of mandatory legislation. The author takes a dispassionate, detached viewpoint in discussing reasons for and methods of establishing standards and grades for consumer goods.

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Patents

Milk Cooled in a Hygienically Closed Chamber in Which Cooler Units are Easily Available for Inspection and Cleaning—James Gregory and Leo A. Babcock, to Oakes & Burger Co., Cattaraugus, N. Y. No. 2,213,671. Sept. 3, 1940.

Yeast Grown in a Nutrient Medium Containing Ammonia Salt of Acetic, Propionic or Butyric Acid as a Nitrogen-containing Nutriment—Ejnar Alfred Meyer, Epsom, England, to Standard Brands, Inc., New York, N. Y. No. 2,214,028. Sept. 10, 1940.

Glutamic Acid Hydrochloride and Derivatives Made From Corn Gluten—J. Paul Bishop, Clarendon Hills and Floyd Lawrence Tucker, Summit, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,214,115. Sept. 10, 1940.

Freshly Skinned Lamb Carcasses Covered With Two Layers of Brine-moistened Cloth While Still Hot and Enclosed in a Moisture-proof Outer Wrapping Preliminary to Freezing and Holding in Freezer Storage; Following Storage, Carcasses are Defrosted Under Controlled Conditions—Beverly E. Williams and Leon L. Cadwell, to Swift & Co., Chicago, Ill. No. 2,214,153. Sept. 10, 1940.

Frozen Foods Given a Transparent Ice Glaze Containing Hydrogen Peroxide to Prevent Cracking of Glaze—Robert Henry Bedford, one-half to Allen T. Sherman, New York, N. Y. No. 2,214,398. Sept. 10, 1940.

Non-acid Food Sterilized by Heating at a Reaction Level of pH 9.0 and Then Adjusted to Desired pH for Consumption—Charles L. Jones, Chicago, Ill., to Continental Can Co., Inc., New York, N. Y. No. 2,214,419. Sept. 10, 1940.

Poultry, Meats and Fish Wetted With a Liquid Containing an 8-carbon, Non-carboxylic Surface-active Agent to Prevent Deterioration—Maurice B. McCadam, Ogdensburg, N. Y., and Milton G. Dimon, Wellesley, Mass., to E. I. du Pont de Nemours & Co., Wilmington, Del. No. 2,214,562. Sept. 10, 1940.

Candy Pulled on Machine Equipped With Hollow Prongs Through Which Flows a Cooling Agent—Ray W. Krout, Paterson, N. J., to Charms Co., Bloomfield, N. J. No. 2,214,793. Sept. 17, 1940.

Whole and Skimmed Milk Blended to Desired Fat Content by a Combination Centrifugal Separator and Blender—Selden H. Hall, Poughkeepsie, N. Y., to De Laval Separator Co., New York, N. Y. No. 2,214,831. Sept. 17, 1940.

Ice Cream Cake Roll Having High Shortening and Soya Flour Content Made So That It May Be Subsequently Frozen Into a Composite Spiral Roll—Paul M. Angell, to Newly Weds Baking Co., Chicago, Ill. No. 2,214,917. Sept. 17, 1940.

Casein Recovered From an Alkaline Solution by Extrusion Into a Metaphosphoric Acid Solution Bath—Charles Schwartz, to Hall Laboratories, Inc., Pittsburgh, Pa. No. 2,215,137. Sept. 17, 1940.

Foods Packaged in Metal Container Having Inner Tin-coated Surface Electrolytically Treated to Prevent Staining and Given an Additional Inner Coating of Electrophoretically Deposited Transparent Lacquer—William Clayton, to Crosse and Blackwell, Ltd., London, England. No. 2,215, 143. Sept. 17, 1940.

Foods Packaged in Metal Containers Having an Inner Tin-coated Surface Treated by Passage Through an Alkaline Electrolytic Bath Containing a Salt Whose Insoluble Oxide or Hydroxide is Uniformly Deposited on Tin Plate Surface—William Clayton, Robert Ian Johnson and Cyril Gordon Sumner, to Crosse & Blackwell, Ltd., London, England. No. 2,215,144. Sept. 17, 1940.

Foods Packaged in Metal Container Having an Inner Surface Coated With an Electrodeposited Temperature- and Acid-resisting Lacquer Comprised of Three Parts Drying Oil and One Part Resin—William Clayton and Harry Kenneth Dean, to Crosse and Blackwell, Ltd., London, England. No. 2,215,145. Sept. 17, 1940.

Foods Packaged in Metal Containers Made From Open-end Tubular Stock Treated With a Water Dispersion of Lacquer for the Electro-deposition of the Lacquer as an Inner Coating of the Container—Cyril Gordon Sumner, Robert Ian Johnson and William Clayton, to Crosse and Blackwell, Ltd., London, England. No. 2,215,166. Sept. 17, 1940.

Durum Wheat Products Treated to Intensify Natural Wheat Color by Passage Through Closed Chamber and Agitating in an Atmosphere of Ammonia Gas—Anderson W. Allred, Rush City, Minn. No. 2,215,168. Sept. 17, 1940.

Bakery Products Fresh From the Oven Cooled for Slicing and Wrapping by Passage Through Zones Controlled at Predetermined Levels of Humidity and Temperature With Final Treating in a Current of Air of Relatively Lower Temperature and Relative Humidity—Wade W. Reece, to W. E. Long Co., Chicago, Ill. No. 2,215,193. Sept. 17, 1940.

Foods Concentrated and Made Resistant to Deterioration by Treatment in an Evaporating Chamber and Subsequently in a Drying Chamber Fitted With Troughs Having Partitions to Aid in Heat Conduction With Removal of Moisture Vapor by Chemical Drying Agent—Earl W. Flosdorf, Ardmore, Pa. No. 2,215,265. Sept. 17, 1940.

Lemon Juice Made Stable by the Addition of 1½ to 3 Percent Acetic Acid Vinegar to Fresh Lemon Juice—Clarence E. Nelson, Chicago, Ill., to Kraft Cheese Co. No. 2,215,334. Sept. 17, 1940.

Lettuce Packed for Shipment Protected Against Discoloration of Butt Ends by Application of Sodium Salt of Thiosulphuric, Hyposulphurous or Pyrosulphurous Acid Prior to Covering With Layer of Crushed Ice Not in Direct Contact With Butts—William H. Wilson, Los Angeles, Calif. No. 2,215,446. Sept. 17, 1940.

Whole Stalk Celery Cut Into Short Lengths or Pieces and Freed From Leafy Portions by Mechanical Means—William E. Urschel and Joe Richard Urschel, Valparaiso, Ind. No. 2,215,535. Sept. 24, 1940.

Canadian Patents

Vitamin D_2 Potency Imparted to Evaporated Milk by Dissolving Activated Ergosterol in Butter Fat and Dispersing It in the Milk—Reginald C. Sherwood and Chas. G. Ferrari, to General Mills, Inc., Minneapolis, Minn. No. 391,097. Sept. 3, 1940.

Ice Cream Rendered Compatible to High Solids Content by Adjusting pH With Calcium or Magnesium Oxide—Ernest D. Fear to De-Raef Corp., Kansas City, Mo. No. 391,242. Sept. 10, 1940.

Dried Milk Improved by Addition of Monostearin or Like Mono- or Diglyceride Esters—Clinton H. Parsons, to Industrial Patents Corp. No. 391,254. Sept. 10, 1940.

Frozen Fish Glazed With an Opaque Coating of Ice by Spraying With Gas-charged Water—Winfield D. Hergert to San Juan Fishing and Packing Co., Seattle, Wash. No. 391,401. Sept. 17, 1940.

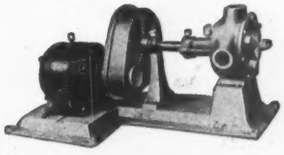
Fats and Oils Destearinized and Depalmitinized by Chilling in Two Stages, First to Form Seed Crystals and Then to Crystallize Stearin or Palmitin—Carl Dedlow, La Plata, Argentina to Swift & Co. No. 391,413. Sept. 17, 1940.

Honeycomb Shaved With a Planer Having a Heated Blade Composed of a Copper Plate and an Edged Hard Metal Plate—John J. Maendel, Elie, Manitoba. No. 391,447. Sept. 24, 1940.

Diarrhea Controlled by a Food Product Comprising a Gel of Pectin and Agar-agar—Chas. A. Tompkin, Detroit, Mich., to Mead Johnson & Co., Evansville, Ind. No. 391,508. Sept. 24, 1940.

For the sake of the pump—fit the pump to the job. That's a good rule to remember regardless of what you're pumping—liquids or semi-solids. If your pumps are NOT large enough, they're wasting time . . . if your pumps are TOO large, they're wasting both power and motion. Viking's complete line of standard "stock" rotary pumps ranges from ½ GPM to 1,050 GPM . . . it includes portable and stationary models . . . presents a wide selection of mountings and drive arrangements. The next time you need a certain size pump to fit a certain size Food Factory pumping job, write, wire or phone Viking.

Write for Bulletin 103-35



LOOK FOR THIS TRADE MARK—THE SIGN OF A GENUINE VIKING!

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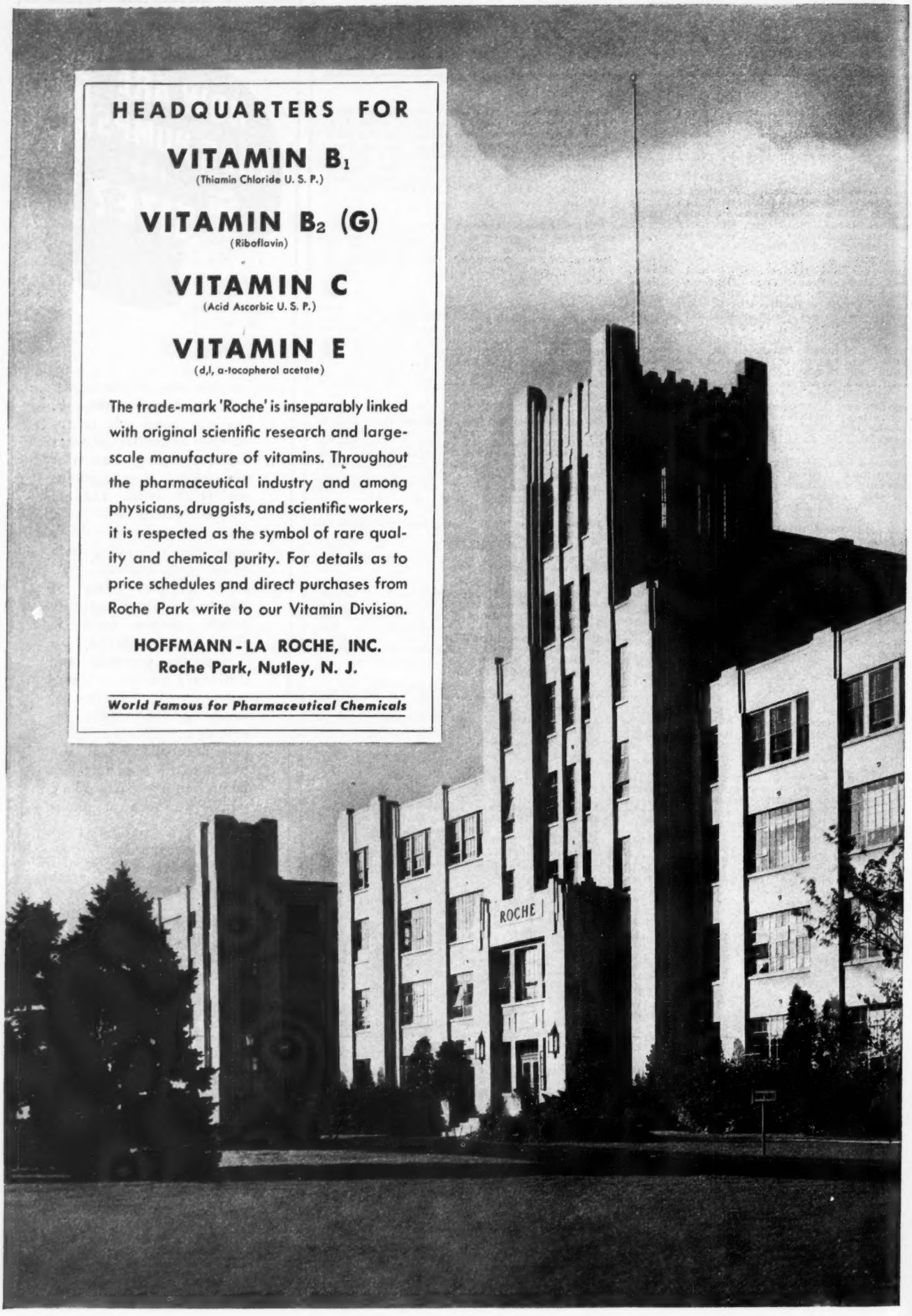
PUMP COMPANY
CEDAR FALLS, IOWA



HEADQUARTERS FOR

VITAMIN B_1
(Thiamin Chloride U. S. P.)

VITAMIN B_2 (G)
(Riboflavin)

VITAMIN C
(Acid Ascorbic U. S. P.)

VITAMIN E
(d,l, a-tocopherol acetate)

The trade-mark 'Roche' is inseparably linked with original scientific research and large-scale manufacture of vitamins. Throughout the pharmaceutical industry and among physicians, druggists, and scientific workers, it is respected as the symbol of rare quality and chemical purity. For details as to price schedules and direct purchases from Roche Park write to our Vitamin Division.

HOFFMANN-LA ROCHE, INC.
Roche Park, Nutley, N. J.

World Famous for Pharmaceutical Chemicals

Formulas for Foods

FORMULA NO. 138

Canned Smoked Abalones
(A New Product)

Procedure here outlined is for the Northern Pacific abalone (*Haliotis gigantea*). Smoking is for the purpose of imparting a pleasing flavor, not for preservation.

Preparation

Use fresh abalones in the shell. Open with an oyster knife and cut away the visceral mass. Trim off the fringes. With a stiff brush, scrub off the black pigment covering the meaty foot. Wash in fresh water.

Place each meat on a board, one at a time, and covered in cheesecloth. Pound once with the flat side of another board. Immerse the "tenderized" meats in 5 percent salt brine for 5 to 10 minutes. Drain.

Place meats in a single layer on ½-in. mesh galvanized wire screen trays previously brushed with cooking oil to prevent the meats from adhering to the wire.

Smoking

Place filled trays in smoke house which has been heated up to 120 deg. F. Smoke 5 hours at 120 deg. F., with 30 percent relative humidity, with smoke from birch sawdust.

Canning

Pack the smoked meats in ¼-lb. flat enameled cans, 2½ oz. of meats and ⅔ oz. of added salad oil. Single seam (clinch) the lids. Exhaust the cans at 8 to 10 minutes at 213 deg. F. Double seam, and then sterilize the cans, 60 minutes at 240 deg. F.

Formula from P. A. Sunderland, Pacific Fisheries Experimental Station, Prince Rupert, B. C. Progress Report No. 45.

FORMULA NO. 139

New England Plum Pudding

Granulated Sugar (sucrose)	**2 lb. 8 oz.**
All-purpose vegetable shortening at 70 to 75 deg. F.	**1 lb. 8 oz.**
Soda	**2 oz.**
Allspice (pimento)	**¼ oz.**
Salt	**3 oz.**
Cinnamon	**1¼ oz.**
Ginger	**¾ oz.**

Cream until smooth.

Whole eggs, 70 to 75 deg. F.	**12 oz.**

Add gradually and mix smooth.

Molasses, good quality	**1 lb.**

Add to foregoing:

Dry bread	**1 lb. 8 oz.**
Water (70 to 75 deg. F.), variable	**3 lb.**

Soak bread in water. Then rub through a sieve and add to foregoing:

Bread flour	**3 lb.**

Add and mix thoroughly.

Currants	**4 lb.**
Seedless raisins	**7 lb.**
Orange peel	**1 lb. 8 oz.**
Citron, finely chopped	**1 lb. 8 oz.**

Add and mix thoroughly. (Currants and raisins should be washed and plumped for 2 hours.)

Scale: In 1-qt. melon molds	**1 lb. 12 oz.**
In brown bread molds	**1 lb. 6 oz.**
In individuals	**2 oz. each**

Further Directions

Cover greased pudding tins and place over water in a brown-bread steamer. Cover the steamer and bake at 350 deg. F. When using a pressure steamer, cook at 8 to 10 lb. pressure. Remove from pans 10 minutes after steamer is out of oven or pressure cooker.

To avoid growth of mold, never wrap puddings while warm. Wrap them on the next day after baking.

Formula adjusted to use of "Covo" as the all-purpose vegetable shortening.

Formula from Lever Brothers Co.

FORMULA NO. 140

Peanut Brittle No. 2

Sugar (white granulated)	**15 lb.**
Corn Sirup	**8 lb.**
Spanish peanuts (raw)	**10 lb.**
Salt	**2 tablespoonfuls**
Soda	**2 tablespoonfuls**

Melt sugar and corn sirup in cooking pan over open fire with continuous stirring.

At 240 deg. F. stir in peanuts and salt. Continue heating and stirring until peanuts are roasted to a golden color.

Remove from fire and stir in soda.

Pour out on oiled cooling slab. Fold in edges of cooling mass to keep nuts well distributed. As mass begins to stiffen, roll and stretch into a thin sheet.

Allow to cool thoroughly before packing.

FORMULA NO. 141

Luxury Pickle and Pimiento Loaf

Beef trimmings	**35 lb.**
Veal trimmings	**25 lb.**
Pork trimmings	**25 lb.**
Bull meat	**15 lb.**
Dry milk solids	**12 lb.**
Sweet pickles	**5 lb.**
Pimientos	**6 lb.**
Onions	**5 lb.**
White pepper	**6 oz.**
Coriander	**2 oz.**
Marjoram	**½ oz.**
Salt	**3 lb.**
Quick cure. (See Formula No. 52)	**1 qt.**

Grind and chop in usual way, adding ice, dry milk, cure and spices. Chop fine then place in mixer. Add pickles and pimientos that have been cut in suitable pieces and mix well.

This can be baked or cooked. For baking, place in greased pans and bake at 200 to 250 deg. F. for 2½ to 3 hours, depending on size of pans. For cooking, stuff in long Frank molds and cook at 160 deg. F. for 3 hours. Then chill. After chilling, stuff in artificial casing.

Formula from Dry Milk Institute

Let NEW CONSUMER INTEREST in VITAMIN B_1 help your sale

Food products should be "true to Nature." In their natural state, many food ingredients contain nutritionally important amounts of vitamin B_1—which are not retained in the finished product because of necessary processing. If this is true of your products, restoration of full natural vitamin B_1 potency with "Crystalline B_1 Winthrop" is recommended for the health and sales advantages it provides.

GROWING INTEREST in vitamin B_1—increasing awareness by consumers that this important health factor is woefully scant in the daily diet—has already suggested new sales advantages to certain food producers, and *should* suggest them to others.

Authorities point out that necessary processing robs ingredients of many manufactured foods of much natural vitamin B_1 potency.

Now this loss can be offset—more nutritional value and consumer appeal put into many food products—by the easy addition of "Crystalline B_1 Winthrop" to restore *fully* lost B_1 potency.

"Crystalline B_1 Winthrop" is thiamine hydrochloride U. S. P.—vitamin B_1 in pure crystalline form. It has no effect on color, odor, taste or bulk; does not complicate production problems. You can use it direct in your own plant, or employ ingredients—white flour, for instance—to which "Crystalline B_1 Winthrop" has been added.

Prices on "Crystalline B_1 Winthrop" have just been reduced far below former levels. Write for new schedule. "Crystalline Vitamin C" (ascorbic acid) prices also sent on request.

WINTHROP

VITAMIN B_1

(THIAMINE HYDROCHLORIDE U. S. P.)

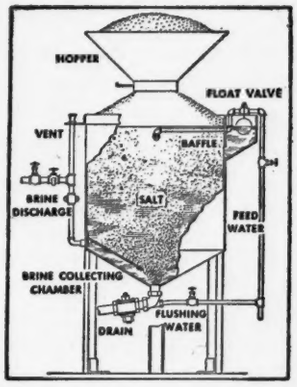
SPECIAL MARKETS DIVISION

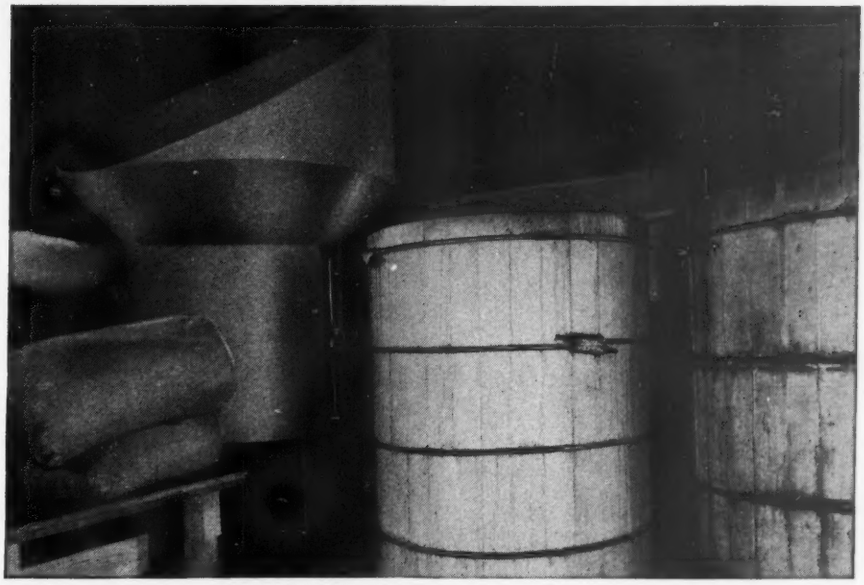
WINTHROP

CHEMICAL COMPANY, INC.

170 VARICK STREET, NEW YORK, N. Y.

3 big improvements in food packing methods with 4 big savings in operating costs





THE PORTLAND PACKING CO., Unity, Maine

This Lixate installation provides brine for use in the specific gravity or "flotation" method of quality grading peas. While uniformity of strength is important in this operation, brine purity is just as important, and a crystal clear brine is also highly desirable. In any food packing process, all three of the major advantages of Lixate Brine are automatically applied to all operations.

FOOD packers in many lines agree that any one of the three major advantages of The Lixate Process make it almost a necessity in a modern plant. For instance, Lixate Brine is produced automatically in advance of requirements and is always on hand to speed up operations. In addition, it can be piped to every part of the plant—a great convenience that does away with the muss and interruptions caused by trucking salt or brine through the plant.

Most important, perhaps, Lixate Brine helps to maintain or improve quality because it is a quality brine—crystal clear, always uniform, always fully saturated, and it is bacteriologically clean and chemically pure far beyond pure food requirements. With these three aids to production, it makes marked economies as well. The four major savings are:

1. Lower cost for handling salt.
2. Elimination of labor or power costs for making brine.
3. Reduced costs for distributing brine throughout the plant.
4. Savings of 10% to 20% in amount of salt needed.

The cross section diagram shows why these savings are possible. Salt, stored in a hopper above the Lixator, flows down by gravity. Water enters through a spray nozzle at the top, dissolves the salt without agitation, and becomes fully saturated brine. Brine, self-filtered and crystal clear, rises in the collecting chamber to a discharge pipe and flows to a storage tank.

Salt is handled but once—when it is put into the hopper. There is no cost for power or labor to make brine. The uniform, pure and crystal clear brine is always on hand, and can be piped to any part of the plant, ready for use at the turn of a tap. Automatic operation reduces waste, with savings estimated by users to be 10% to 20% in the amount of salt required. Write for a copy of The Lixate Book, for a detailed description of this cost saving, automatic brine making process.

★ ★ ★

● SALT FOR EVERY PURPOSE

The Lixate Process is one of the many contributions to industrial progress made by International Salt Company, Incorporated. International produces all types and grades of granulated salt (vacuum evaporated); flake salt (grainer evaporated); and Rock Salt. The advice and counsel of The Research Department of International Salt Company, Incorporated, is freely offered to all who use salt and salt brine in industry.

● WRITE FOR THIS BOOK

In addition to a detailed explanation of the automatic operation of The Lixate Process, The Lixate Book contains valuable information about the properties of salt brine. This useful book should be in every food packer's library of industrial literature. A free copy will be sent on request.

The LIXATE *Process*
REG. U. S. PAT. OFF.
for making brine

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SALES OFFICES: *New York, N. Y. • Buffalo, N. Y. • Philadelphia, Pa. • Boston, Mass. • Baltimore, Md. • Pittsburgh, Pa. • Newark, N. J. • Richmond, Va New Orleans, La. • Cincinnati, O. • St. Louis, Mo.*
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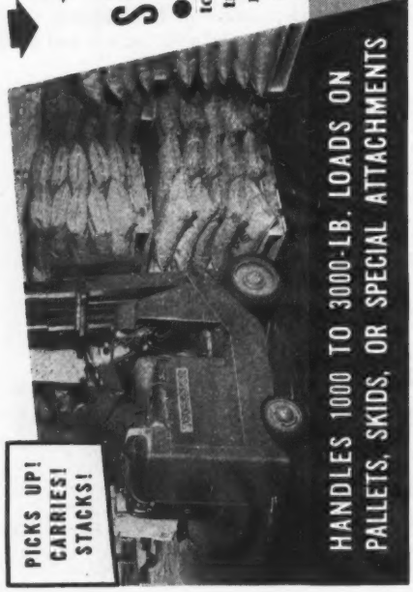


PICKS UP! CARRIES! STACKS!

HANDLES 1000 TO 3000-LB. LOADS ON PALLETS, SKIDS, OR SPECIAL ATTACHMENTS

FORMULA NO. 142

Dark Fruit Cake Batter

High quality cake flour	**1 lb.**
Salt	**4 oz.**
Cinnamon, powdered	**1 oz.**
Pimento (allspice), powdered	**½ oz.**
Cloves, powdered	**¼ oz.**
Lemon extract	**1 oz.**
Butter at 70 deg. F.	**1 lb.**
Emulsified type shortening at 70 deg. F.	**2 lb.**
Granulated sugar (sucrose)	**4 lb. 4 oz.**

Sift together the flour, salt, cinnamon, allspice and cloves. Place all the foregoing ingredients in mixing-machine bowl. Cream together on low speed for about 5 minutes.

Do not overcream! Scrape down bowl frequently.

Whole eggs, at 70 deg. F. 4 lb.

Add slowly to above during a 5-minute mixing period on low speed. Mix for about 5 minutes more on low speed, or until light. Scrape down bowl frequently.

Invert sirup	**2 lb. 8 oz.**
Water	**12 oz.**

Mix together the water and invert sirup. Add to the above while mixing on low speed.

High-quality cake flour	**7 lb.**
Baking powder	**1 oz.**

Sift together the flour and baking powder. Add to the above and mix until smooth, or for about 4 minutes on low speed.

Total weight of mix 22 lb. 15¾ oz.

This batter is for use with Formula No. 143.

Best results are obtained when finished batter is at 72 to 75 deg. F.

Directions are for a 3-speed, mixing machine. On a 4-speed machine, use second speed.

N.B. This formula was developed for use with Swans Down Cake Flour and Calumet Baking Powder.

Formula from General Foods Sales Co., Inc.

FORMULA NO. 143

Dark Fruit Cake (Rich Type)

Seedless Raisins	**8 lb. 12 oz.**
Currants	**3 lb. 12 oz.**
Citron, strips	**3 lb. 8 oz.**
Lemon peel, diced	**1 lb. 8 oz.**
Orange peel, diced	**1 lb. 8 oz.**
Glazed red cherries, cut	**6 lb.**
Glazed pineapple, strips	**4 lb.**

Wash the raisins, currants and glazed fruit before preparing. Blend together thoroughly in a metal container.

Molasses, high grade	**2 lb. 8 oz.**
Water	**1 lb. 4 oz.**
Rum extract	**4 oz.**

Mix together the molasses, water and rum extract. Add to the fruit mixture, blending thoroughly by hand. Cover with a cloth and steep overnight.

Pecan pieces	**2 lb. 8 oz.**
Almonds, blanched	**2 lb. 8 oz.**

Blend nuts into the above steeped mixture by hand.

Dark fruit cake batter (Formula No. 142)	**23 lb.**

Pour batter over the above fruit and nut mixture. Blend together well by hand.

Total weight of mix ..... **61 lb.**

Further Working Directions

Cut all fruit carefully and uniformly. If fruits are dry and hard, first soften them by steaming. But do not steep them in hot water. Avoid crushing the fruit when blending the batter and fruit mixture.

Baking—Use paper-lined pans.

Pound cake pan, wooden lined (14x7x3½ in.). Scale 5 lb. Bake 1¾ to 2 hours at 300 deg. F.

Loaf pans (8x4x2½ in.). Scale 1 lb. 10 oz. Bake 1½ to 1¾ hours at 300 deg. F.

Ring pan (7½x2¾ in.). Scale 2 lb. 4 oz. Bake 1½ to 1¾ hours at 310 deg. F.

Before baking, wash the top of each cake lightly with a wash consisting of equal parts of whole eggs and liquid skim milk. Decorate the top with fruit and nuts.

Bake in a humid oven. If oven is not equipped with steam, use pans of water in the oven. If oven is flashy, cover cakes with dampened kraft paper or asbestos to prevent burning.

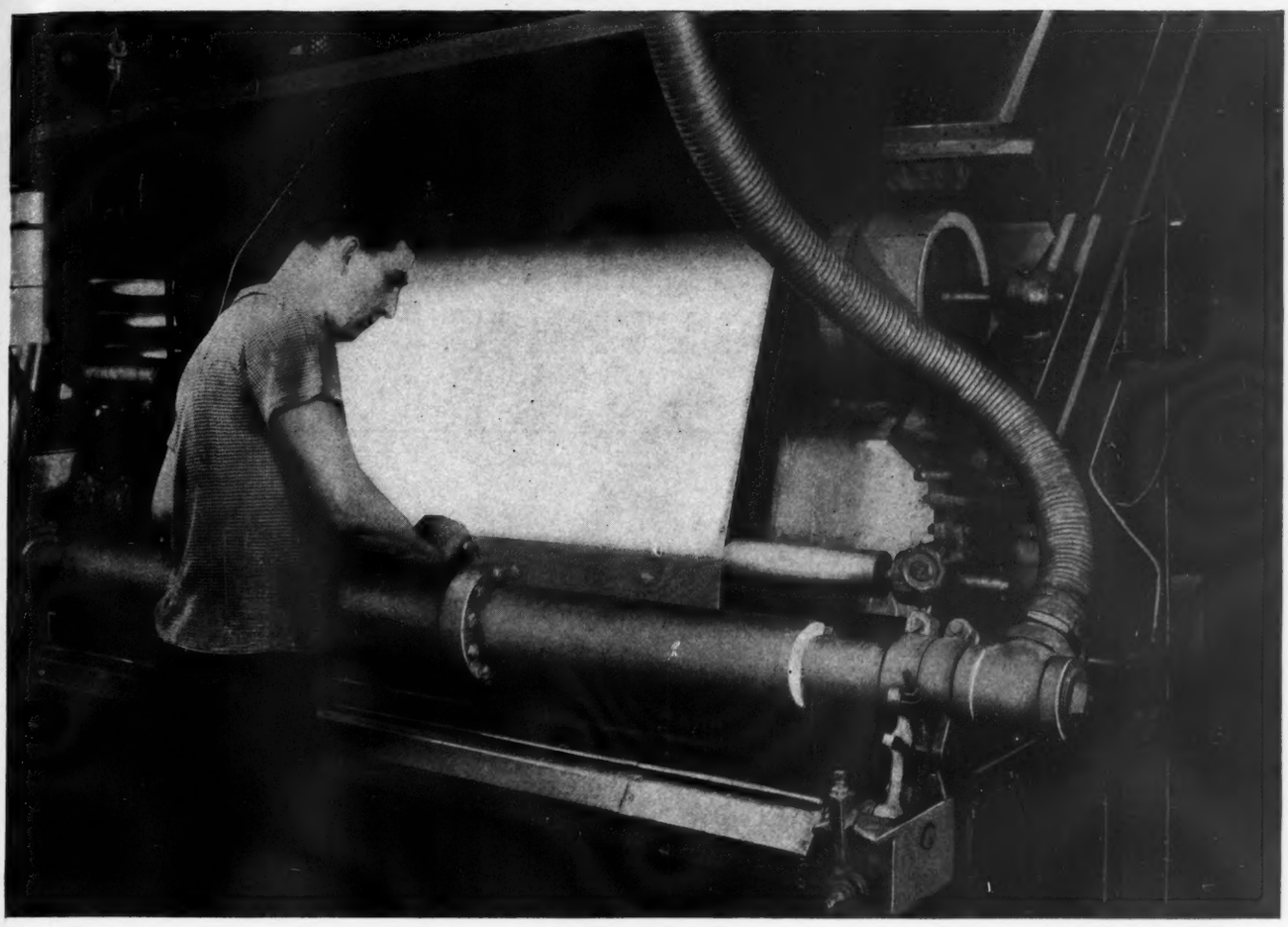
Finishing—Brush tops of cakes while still warm with a glaze made as follows:

Corn sirup	**1 lb. 12 oz.**
Water or fruit juice	**12 oz.**
Gum arabic	**½ oz.**
Water or fruit juice	**4 oz.**

Heat sirup and water to a full rolling boil. Dissolve the gum in the 4 oz. of liquid. Add to boiling sirup. Bring to rolling boil again.

Packaging—Wrap cakes in transparent wrapping material after they are thoroughly cooled. Store in a cool dry place.

Formula from General Foods Sales Co., Inc.



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**Coating operation illustrated above*

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TOPS WITH YOUR PRODUCTION MAN: He'll appreciate all the physical "plus-features" of an Armstrong's Glass Container. Rigorous testing by experts in Armstrong's Factory Control Laboratories assures utmost strength for your package as well as smooth flow through your plant equipment. Armstrong also maintains a Central Technical Laboratory to determine the best type of closure for your product. You can be sure of unbiased recommendations, too, because Armstrong makes a wide variety of closures.

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CEL-O-SEAL bands (made by du Pont), are supplied by Armstrong. Their bright color and neat appearance give display advantages of a second label. These outer seals, sanitary and tamper-proof, may be impregnated with copy.

PUT your glass packaging problems up to us. Armstrong's Package Merchandising Department, and our complete factory and laboratory facilities are at your disposal without charge or obligation. For full data and complete information about this service, write today to Armstrong Cork Company, Glass and Closure Division, 919 Arch Street, Lancaster, Pa.

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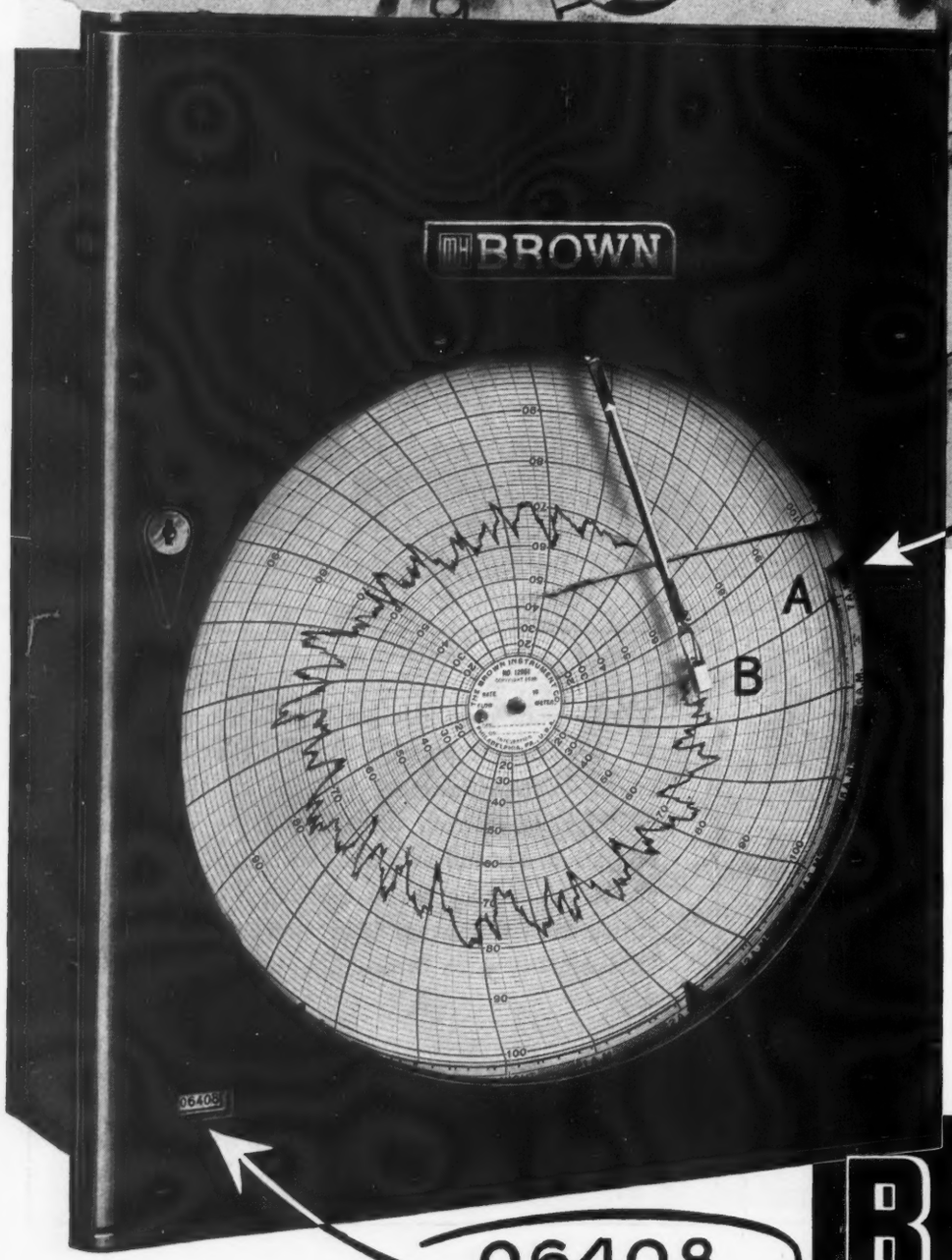
IS GLASS PACKAGING HEADQUARTERS



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"B" This record line shows rate of flow and enables the operators to maintain the most efficient boiler operation, thus effecting substantial fuel savings.

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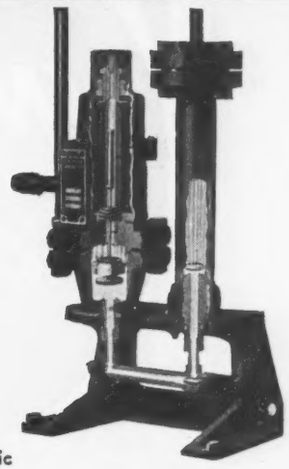
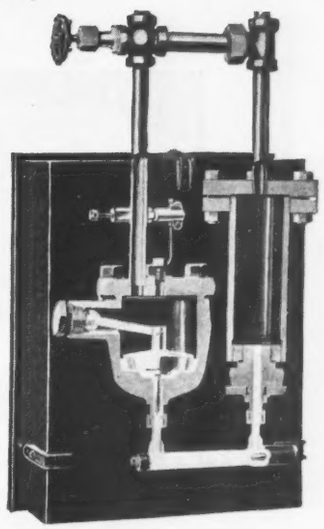
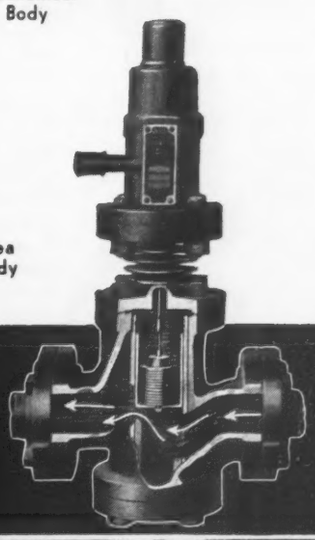


Brown Electric Meter Body



Brown Mechanical Meter Body



Brown Area Meter Body

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A Conveyor Chain THAT OPERATES IN 2 PLANES

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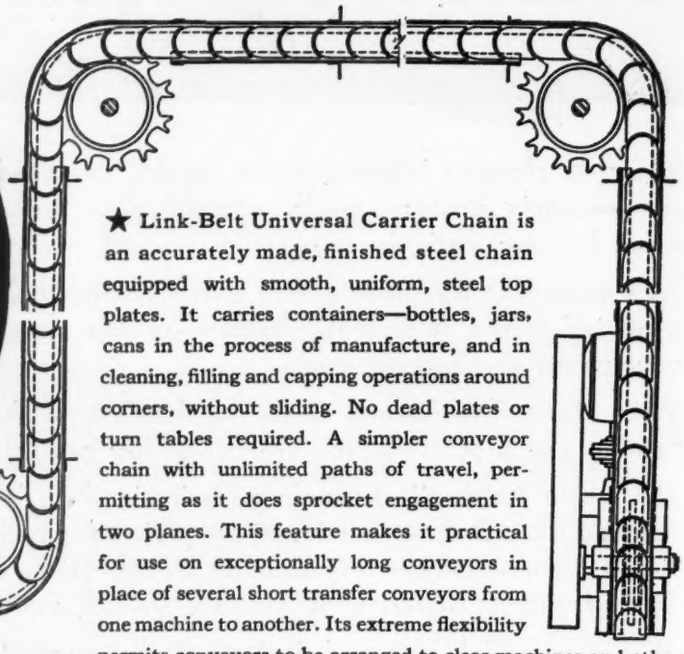
UNIVERSAL CARRIER CHAIN



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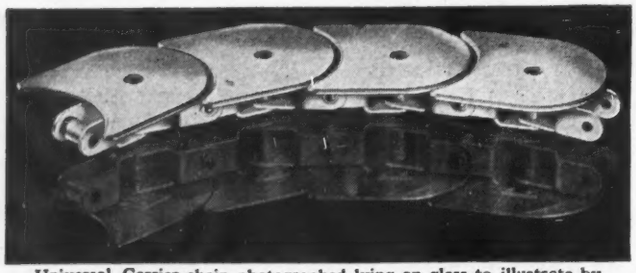
8331A



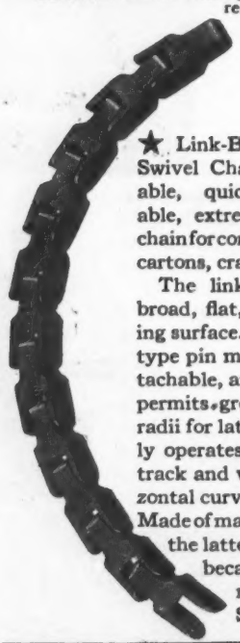
Universal Carrier chain photographed lying on glass to illustrate by reflection its underside.

LINK-BELT COMPANY

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

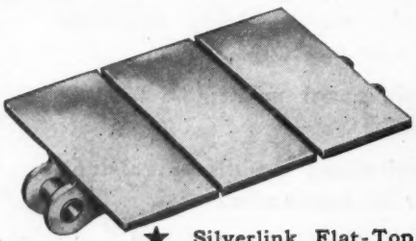
Indianapolis, Chicago, Philadelphia, Atlanta, Dallas, San Francisco, Toronto. Branch offices, warehouses and distributors in principal cities.

OTHER TYPES OF LINK-BELT CARRIER CHAINS



★ Link-Belt No. 4250 Swivel Chain is a durable, quickly detachable, extremely flexible chain for conveying cases, cartons, crates and cans.

The links provide a broad, flat, clean carrying surface. The cast ball and socket type pin makes the chain easily detachable, and the joint construction permits great flexibility and short radii for lateral curves. Chain usually operates in standard 2″ channel track and will operate around horizontal curves as small as 12″ radius. Made of malleable iron or PROMAL, the latter being usually preferred because of its longer life and resistance to corrosion. Send for Folder FI 1637.



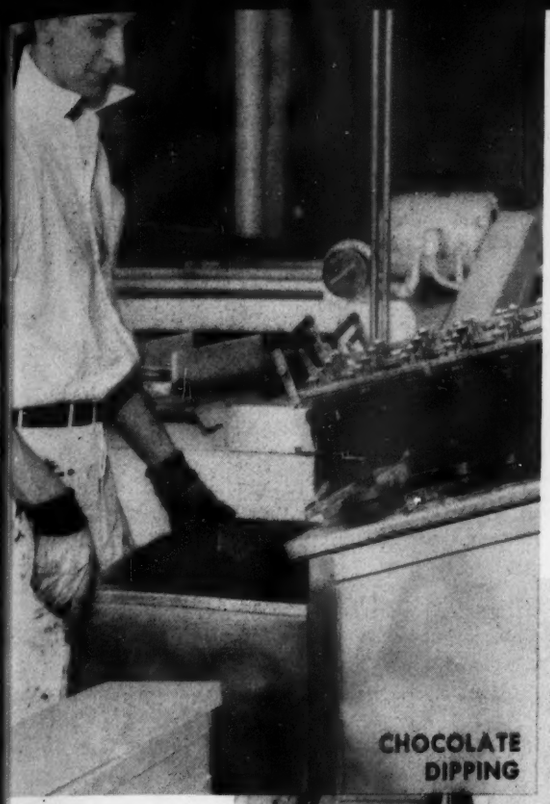
★ Silverlink Flat-Top Conveyor Chain is used for handling bottles, jars and cans through cleaning, filling and capping operations. For this service, the chain articulates freely and prevents "humping." Its light weight results in minimum power requirements and wear, and permits the return-run to hang unsupported without requiring excessive structural strength. Metal specifications may be selected for resistance to acid action or corrosion, and to withstand thorough cleaning during and after the day's run. Send for Folder FI 1637.

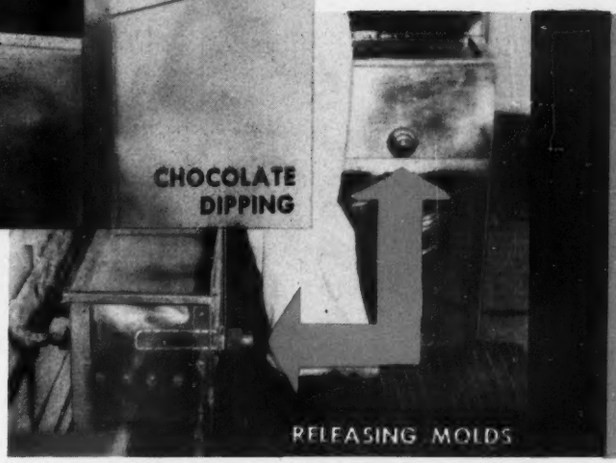
★ Link-Belt Crescent Conveyor Chain with attachments is cast or formed from ferrous or non-ferrous material, to make a continuous conveyor for handling bottles or other containers in a rectangular, circular, semi-circular or snake-like path. A conveyor employing this chain presents a practically unbroken surface, even at the turns. The bottoms of the attachments present good sliding surfaces for supporting guides.

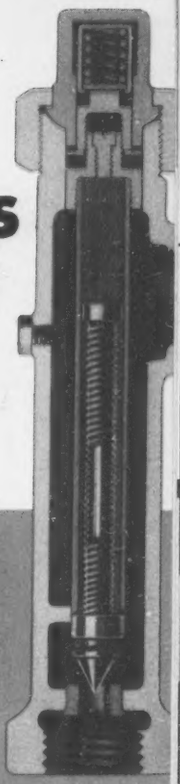
Send for literature.

SAVED!

—a Million Drops of Chocolate— with 2 little







SARCO No. 87 THERMOTONS

Sarco No. 87-S Thermotons were incorporated as part of the original equipment by Anderson Bros. Mfg. Co., Rockford, Illinois.

And that's only half the story at the Golden Rod Ice Cream Company plant in Chicago where they have recently stepped up production of chocolate ice cream sticks from 6,000 to 12,000 per hour with the help of Sarco.

Correct temperatures are essential. Here you have a mold of 24 frozen bars to be released by dipping in the hot water tank at the left. Too cool, the bars stick, break off, slow up the whole job. Too hot, the ice cream melts, the chocolate will not take hold properly, you have to stop the job completely.

Again, when you come to the chocolate dip shown at top, the temperature of the chocolate has to be right or it won't go on right. And, more important perhaps, it won't jiggle off right and you will get nubs or depressions at the bottom of the bar, and lose millions of drops of chocolate in the bargain.

These troubles are all definitely eliminated, with a better product and lowered costs, by the use of the two Sarco Thermotons shown above. In fact, the output of this machine has been doubled recently without any change in the original Sarco Equipment.

SARCO PRODUCTS SAVE

Materials • Time • Tempers
Steam and Water

IS YOUR BUSINESS SO MUCH DIFFERENT?

There may be a dozen spots where a variation of as little as five degrees is costing you $1,000 per degree per year. Try one Sarco Control on our Representative's recommendation—it's surprising how little they cost. They are described in Catalog Nos. 52 and 146.

SARCO

Represented in Principal Cities

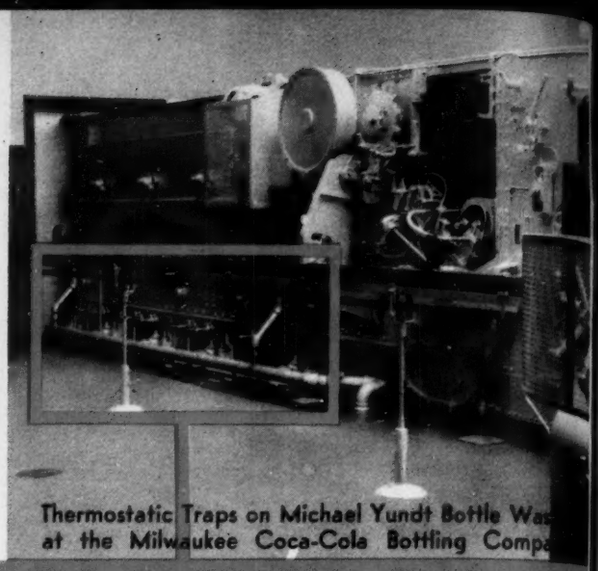
SARCO COMPANY, INC., 183 Madison Ave., NewYork, N. Y. • Sarco Canada Ltd., Federal Bldg., Toronto, Ont

SAVES STEAM

COCA-COLA
MILWAUKEE

Insures Economy and Production with

SARCO



Thermostatic Traps on Michael Yundt Bottle Was
at the Milwaukee Coca-Cola Bottling Compa

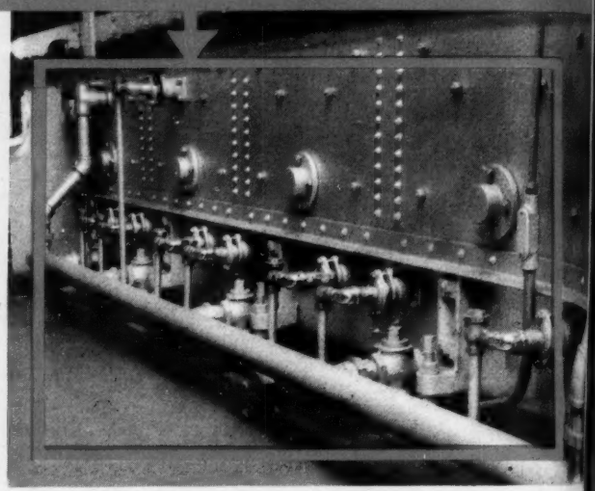
ON THEIR NEW BOTTLE WASHING EQUIPMENT

with **SARCO STEAM TRAPS**

SARCO TYPE E

Nickel plated machinery, overhead daylighting, tiled floors and uniformed attendants are dominant characteristics of this new Milwaukee Coca-Cola Bottling Company Plant. And, of course, Sarco Steam Traps, because this plant is also designed for efficiency and reliability.

In this case it's a low pressure job using steam right off the 2 lb. heating mains, with eight Sarco Type E's dripping the coils. This trap does everything the Sarco No. 9 high pressure trap will do and has won equally high recognition in its field.

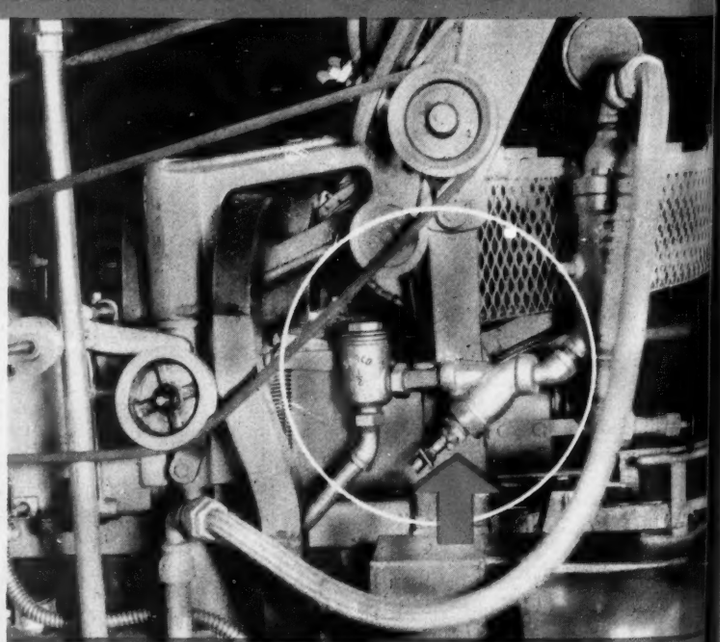


AND IN A LARGE OLEOMARGARINE PLANT

SARCO No. 9

it's speed with accuracy that counts most. So here you see a Sarco No. 9 Thermostatic Steam Trap and a Sarco Strainer as installed by the White Cap Company on all vapor-vacuum sealing machines in a large Midwest oleomargarine plant.

"Trouble? I should say not! In fact, it works so well that we purchased three sets of Sarco Float-Thermostatic Traps that heat up our incoming tank cars in half the time and reduce the amount of steam required at the same time." Ask for Catalog No. 48.

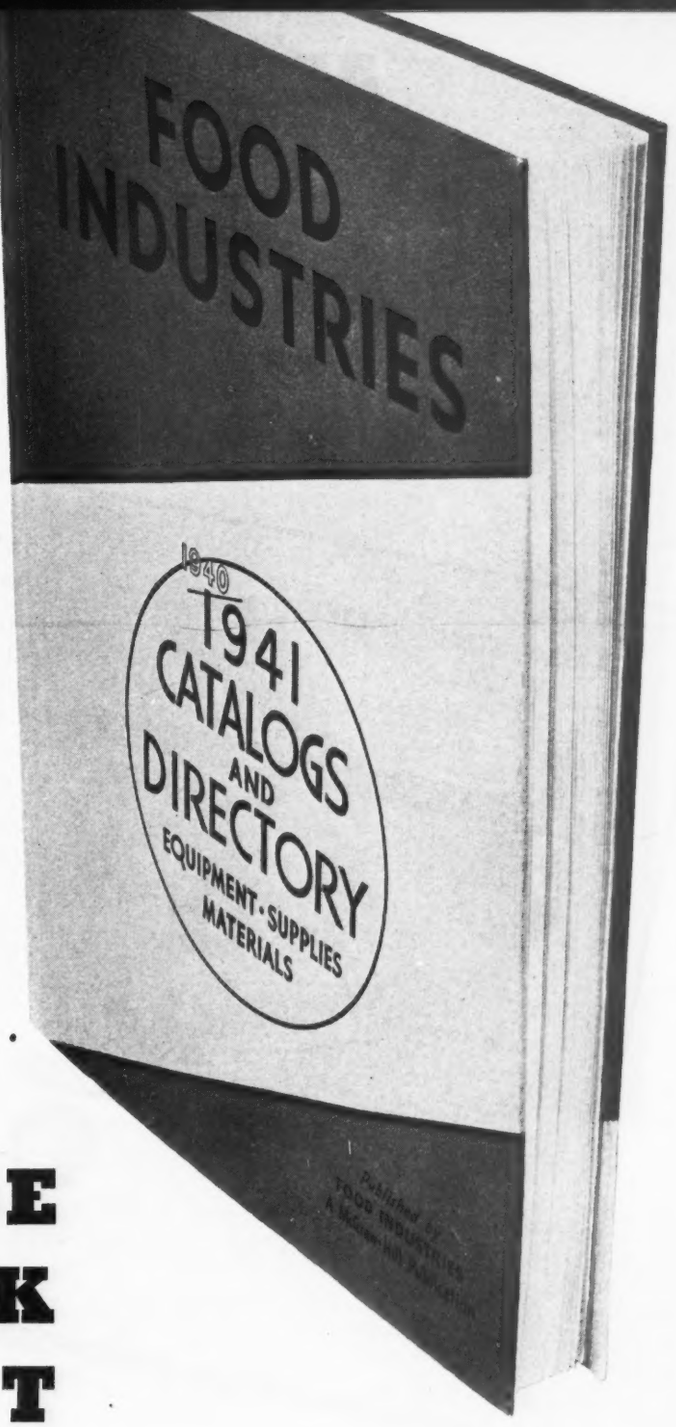


Represented in Principal Cities

SARCO

SARCO COMPANY, INC., 183 Madison Ave., NewYork, N. Y. • Sarco Canada Ltd., Federal Bldg., Toronto, Ont.

To the 12,800 Food Production Men who now have their copies of The New 1940-41 Food Industries Catalogs & Directory.



HOW TO USE THIS BOOK for PROFIT

. . . as a "looking up place" to find out who makes food processing, packaging and handling equipment, materials and supplies—and to get the information you need when you're ready to buy

. . . as a guide to restrictions and regulations governing your product when it goes into inter-state commerce

. . . to find the names and addresses of equipment and supplies manufacturers

ALL those "buying facts" you want to know about machinery equipment and supplies before you place your order — sizes — capacities — speeds — construction — and similar information can be found easily and quickly by turning to . . .

ACME STEEL COMPANY

General Offices: 2845 Archer Ave., Chicago

ACME Steelstrapped SHIPMENTS ARE "BOUND TO GET THERE"

ACME TOOLS AND ACCESSORIES

ACME Unit-Load PROCESS FOR CARLOAD AND L.C.L. SHIPMENTS

Food Industries Catalogs and Literature

ACME STEEL COMPANY

ACME Silversticher FOR SPEEDIER—EASIER—MORE ECONOMICAL CARTON STITCHING

AVAILABLE IN 3 TYPES

ACME Silversticher FEATURES

ACME Silversticher SPECIFICATIONS

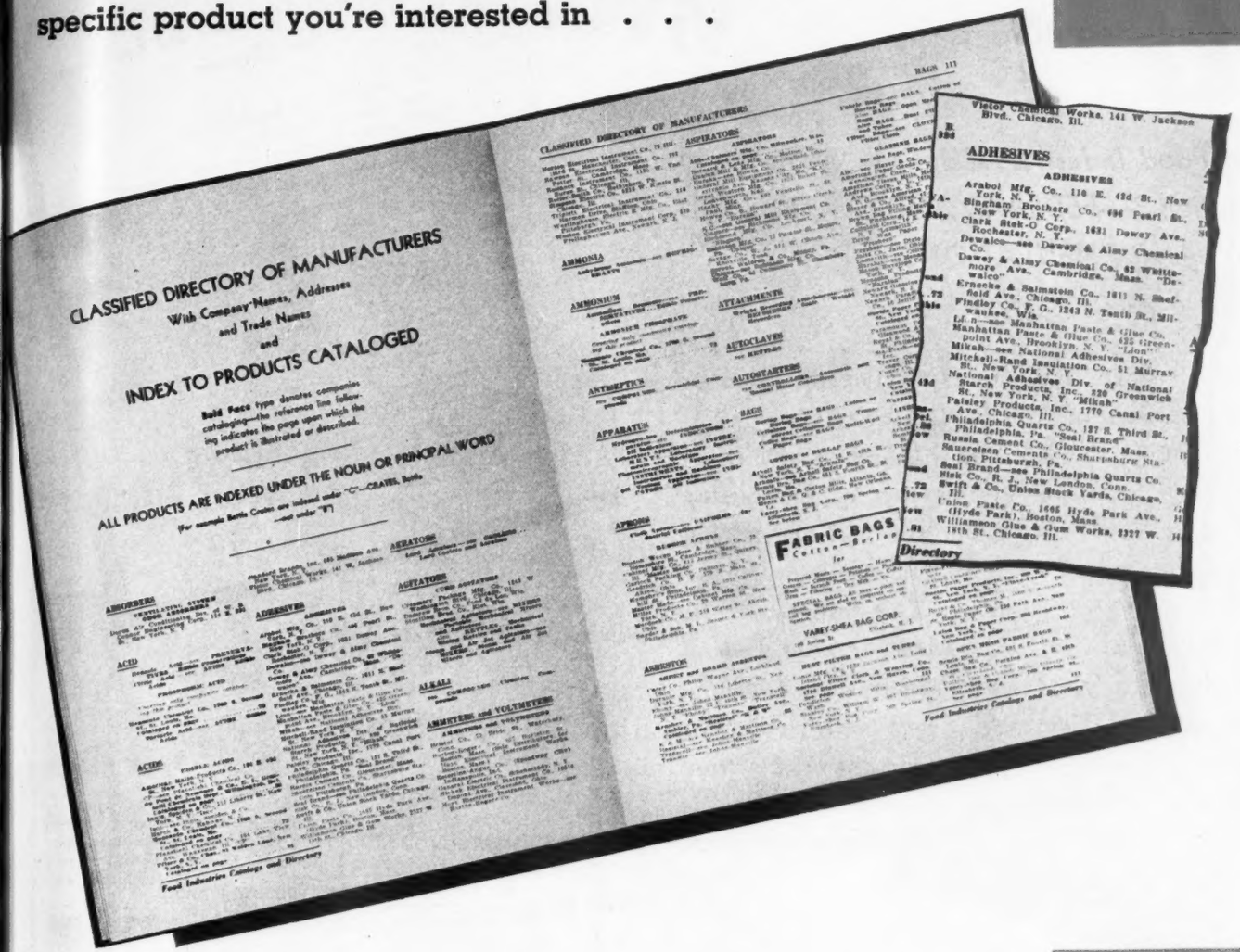
Food Industries Catalogs and Literature

Section I—MANUFACTURERS CATALOGS

(Preceded by an Alphabetical Index)

Right in the front of the book you'll find over a hundred pages of buying information on essential food processing equipment, supplies and materials. For example, pictured above is the 2-page catalog of the Acme Steel Co. which leads off this section. Following this are the catalogs of Allis-Chalmers, Alloy Products, Alsop Engineering and 82 other nationally known manufacturers appearing in alphabetical order and offering you the widest selection available in one volume of everything you need in your business from agitators to waxed paper. Whether you are in the market for equipment right now or not, it would pay you to turn through these pages now to learn what's new and what's available.

HOW to find quickly and easily the names of all the manufacturers who make a specific product you're interested in . . .


CLASSIFIED DIRECTORY OF MANUFACTURERS

With Company Names, Addresses and Trade Names

and

INDEX TO PRODUCTS CATALOGED

Bold Face type denotes companies cataloging—the reference line following indicates the page upon which the product is illustrated or described.

ALL PRODUCTS ARE INDEXED UNDER THE NOUN OR PRINCIPAL WORD

ADHESIVES

FABRIC BAGS

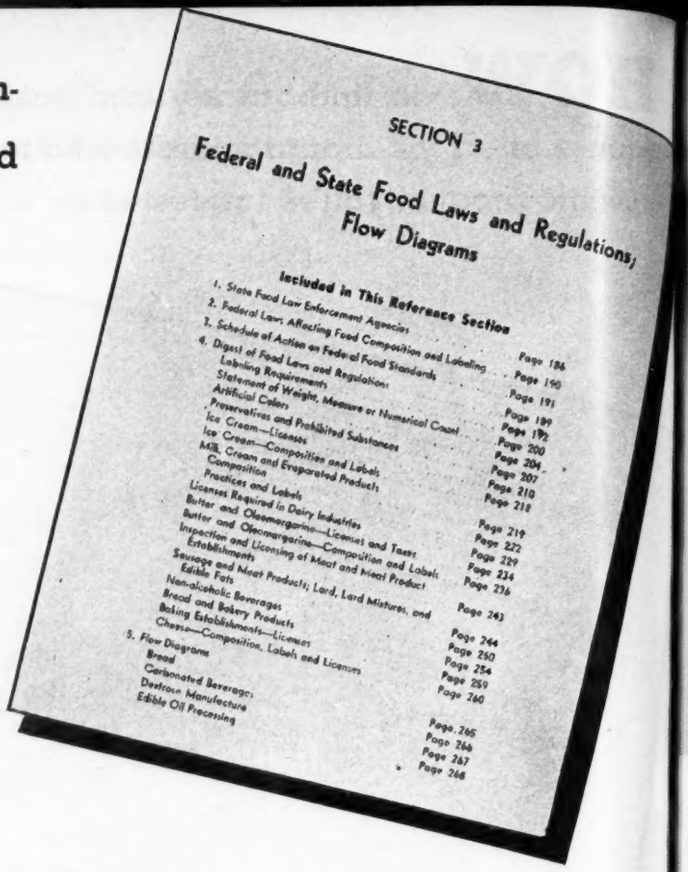
Directory

Open Food Industries Catalogs & Directory at Section 2—CLASSIFIED DIRECTORY (of products)

Directly following the manufacturer's catalogs in your copy of FOOD INDUSTRIES CATALOGS & DIRECTORY you'll find 73 pages listing 482 different types of products needed in the manufacture and distribution of foods. These products are listed alphabetically, and under each separate product is a list of a majority of the manufacturers who make it. Pictured above are the opening two pages of this section. Inset shows typical listing. One of the greatest values *to you* of this section is the fact that it gives you an unduplicated opportunity to shop around for the best values without leaving your desk. Refer to this section before you place your next order—you may be able to save money or get a better product.

HOW to Avoid Losses Due to Confusion regarding State and Federal Food Laws and Regulations

Open Food Industries Catalogs & Directory at Section 3—FEDERAL AND STATE FOOD LAWS AND REGULATIONS.



SECTION 3

Federal and State Food Laws and Regulations; Flow Diagrams

Included in This Reference Section

1. State Food Law Enforcement Agencies . . . Page 186
2. Federal Laws Affecting Food Composition and Labeling . . . Page 190
3. Schedule of Action on Federal Food Standards . . . Page 191
4. Digest of Food Laws and Regulations:
Labeling Requirements . . . Page 199
Statement of Weight, Measure or Numerical Count . . . Page 199
Artificial Colors . . . Page 199
Preservatives and Prohibited Substances . . . Page 200
Ice Cream—Licenses . . . Page 200
Ice Cream—Composition and Labels . . . Page 204
Milk, Cream and Evaporated Products . . . Page 207
Composition . . . Page 210
Practices and Labels . . . Page 212
Licenses Required in Dairy Industries . . . Page 219
Butter and Oleomargarine—Licenses and Taxes . . . Page 222
Butter and Oleomargarine—Composition and Labels . . . Page 229
Inspection and Licensing of Meat and Meat Product Establishments . . . Page 234
Sausage and Meat Products; Lard, Lard Mixtures, and Edible Fats . . . Page 236
Non-alcoholic Beverages . . . Page 243
Bread and Bakery Products . . . Page 244
Baking Establishments—Licenses . . . Page 250
Cheese—Composition, Labels and Licenses . . . Page 254
5. Flow Diagrams . . . Page 259
Bread . . . Page 260
Carbonated Beverages . . . Page 265
Dextrose Manufacture . . . Page 266
Edible Oil Processing . . . Page 267
. . . Page 268

Pictured above is the title page of the legal or *editorial* section of FOOD INDUSTRIES CATALOGS & DIRECTORY. You will find no advertising or buying information in this part of the catalog which comprises 83 pages, but you will find a comprehensive digest of statutory and regulatory provisions affecting *your* business. This information includes *State Food Law Enforcement Agencies, Federal Laws Affecting Food Composition and Labeling, Digest of Food Laws and Regulations,* and Flow Diagrams on *Bread, Carbonated Beverages, Dextrose Manufacture,* and *Edible Oil Manufacture.* This is important to you—turn to Sec. 3 right now and check on the legal aspects of your business.

Last, but not least, is Section 4—ALPHABETICAL COMPANY NAME AND TRADE NAME INDEX.

This section consists of 24 pages listing the names of manufacturers of food equipment, materials and supplies (with available trade names) under the many headings in Section 2, rearranged alphabetically.

Special Notice

If, for some reason, you can't find the information you need in this catalog, *turn to page 184* where you will find a series of *business reply cards.* These cards have been inserted in your copy of FOOD INDUSTRIES CATALOGS & DIRECTORY *especially for your convenience.* Simply fill in the details of the information you want on one of these cards and drop it in the mail box (no postage required). We'll do our best to answer your inquiry to your complete satisfaction.

FOOD INDUSTRIES CATALOGS & DIRECTORY

330 West 42nd Street **New York, N. Y.**

COSTS GO DOWN
SAFETY GOES UP

When You Install a G-E Combination Starter

HERE'S HOW YOU SAVE

1. Simplifies Ordering
Simply specify the motor rating and indicate the type of disconnect desired — we'll send just the control you need.

2. Facilitates Mounting
When you receive it, it's all in one package, ready to deliver to the job, put in place, and wire in.

3. Simplifies Wiring
Attach power and motor leads to the well-marked terminals, connect to push button, and starter is ready for operation.

Mr. Motor User,

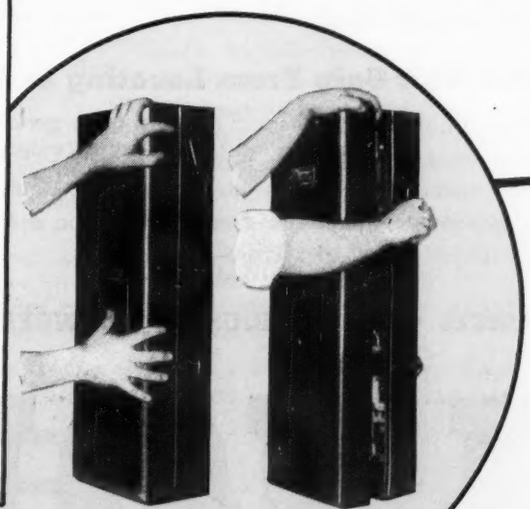
WE think you will want to know about a "short-cut" to savings—one that dozens of customers have told us about enthusiastically. They have found that by using our CR7008 combination starters* they effect material savings on the installed cost of control for their motors.

They are also continuing to *specify* these starters because of extra safety features. Greater protection is afforded for operators and equipment.

How to get in on these savings

Next time you install control for a motor, use a single unit instead of several—make it a G-E combination starter. Keep an accurate record of the cost of the starter *plus* the cost of installation. Compare that with the cost of buying separate devices, mounting and wiring them. You'll enjoy a material saving with the G-E *combination* starter, and at the same time get a control that will give you the advantage of *extra safety*. General Electric Company, Schenectady, N. Y.

**The G-E combination starter consists of a manual disconnect, with or without fuses (or a manual circuit breaker), plus a magnetic starter for operation by push-button stations.*



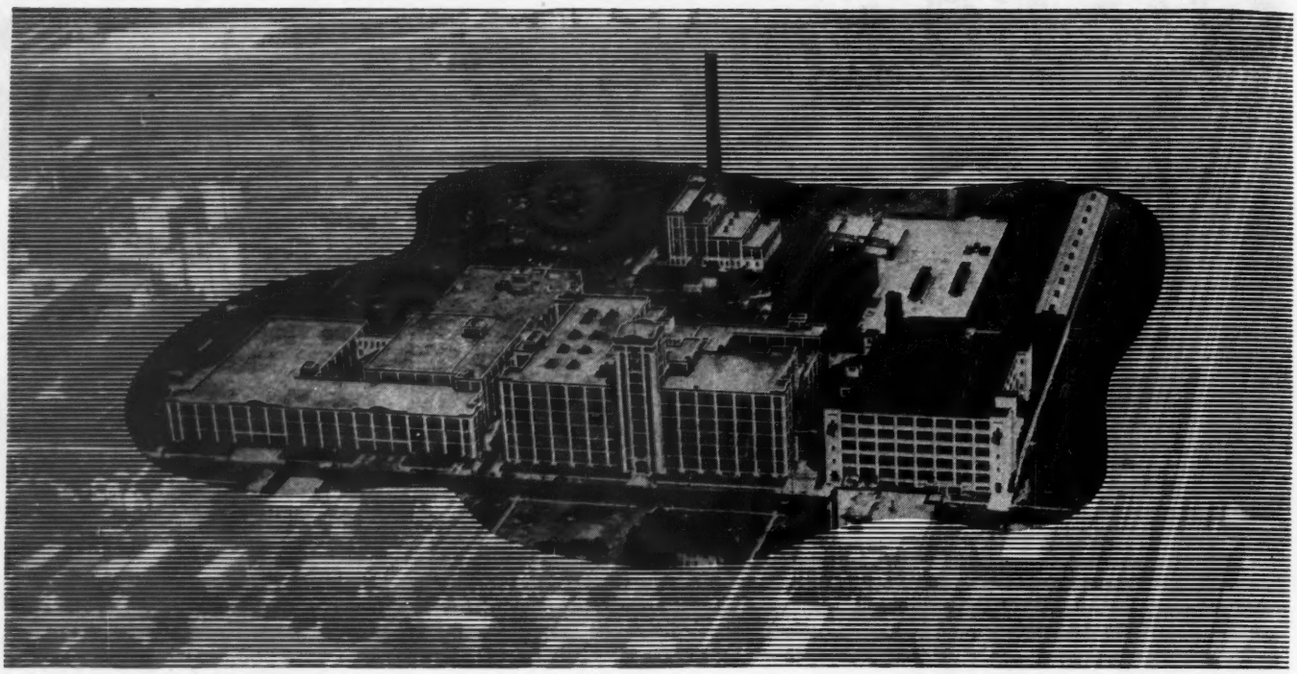
HERE'S WHY IT'S SAFER

Cover of enclosure cannot be opened unless manual switch is open and power removed from all exposed parts. As long as cover remains open, manual switch cannot be closed to apply power.

Also you get short-circuit protection with fuses or breaker; overload protection with accurate isothermic (bi-metal) relays; undervoltage protection—prevents accidental restarting after power failure.

GENERAL ELECTRIC

676-17



For More Efficient Production...Easier Distribution...Greater Profits

Locate Your Plant in ILLINOIS

ILLINOIS is the logical location for a Food Manufacturing, Processing or Packing Plant, when you consider the advantages you gain in every factor of profitable operation. IN PRODUCTION—the advantages of a location close to the center of agriculture, in a State which produces the third largest volume of agricultural products, and where every machinery need in handling, processing, and packing of food products is manufactured close at hand, result in more efficient production. IN DISTRIBUTION—Illinois stands alone in the combination of central location, direct transportation to all markets of the Nation, either by rail or highway, access to foreign and Central and South American Trade via the Lakes-to-the-Gulf Waterway and the Great Lakes-St. Lawrence Waterway, and overnight shipping service to the huge Middle West Market, with a population in excess of fifty million. GREATER PROFITS result from the increased efficiency of production, and the time and money savings in distribution of the finished product effected by locating in Illinois.

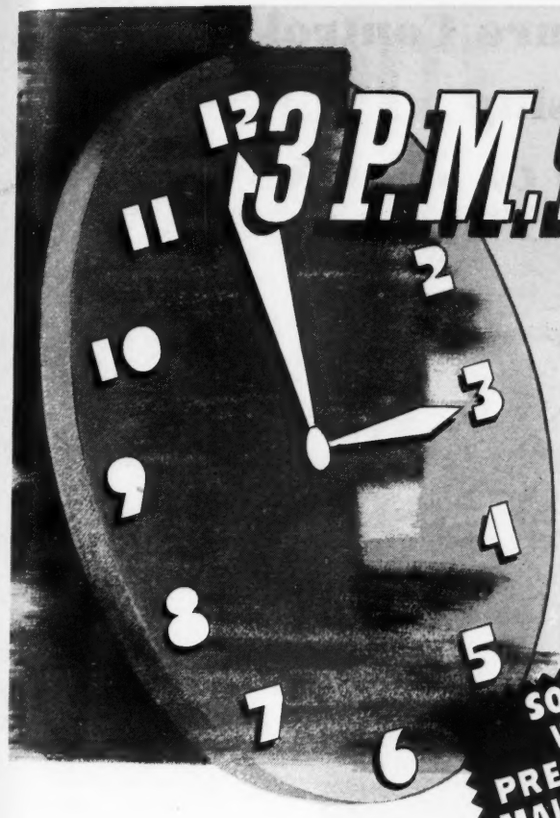
Check the Benefits You Will Gain From Locating in Illinois

If you are contemplating a change in location, or the establishment of a branch plant, get all the facts regarding the advantages Illinois offers before making your final decision. Write the Illinois Development Council, at Springfield, for a special confidential report containing full facts on raw materials, labor, taxes, power, fuel, transportation, plant sites, machinery and equipment supplies, and other production and distribution advantages. Your inquiry will, of course, be kept strictly confidential. Write—

ILLINOIS DEVELOPMENT COUNCIL • STATE HOUSE • SPRINGFIELD, ILLINOIS

ILLINOIS

THE STATE OF BALANCED ADVANTAGES



3 P.M. SHUTDOWNS

A Case Where Too Much Steam Made Trouble

SOLVED WITH PREVENTIVE MAINTENANCE

"YOU'LL have to shut down at three today," the Superintendent of a northwestern wood-working plant said to his shop foreman. ". . . Kiln's tied up again with heating trouble!"

The plant was swamped with orders—like many another shop today. And repeated valve trouble in the steam line at the kiln meant falling farther behind on deliveries.

Preventive Maintenance was the only answer. For it's the only way of solving piping problems permanently. Yet, Preventive Maintenance is a simple technique—just a matter of *being sure* the installation is right, and the valves and fittings the best for service conditions.

The Superintendent saw the waste in ordinary repair—he called in H. E. O., the Crane Man. His wide experience would help to remedy the trouble quickly and surely.

Here's what the two men found: Steam was piped from the boiler with a four-inch line equipped with a four-inch pressure-reducing valve. And there was the source of the trouble! The valve was much too large. It couldn't operate properly at the low pressure setting required. Severe wire-drawing cut the seat and disc. The valve leaked—pressure went up—the kiln temperature couldn't be controlled.

Preventive Maintenance counseled replacement with a two-inch pressure regulator. It would give ample steam for heating the kiln. It would give finer control without restricting operation of the automatic valve mechanism. A Crane No. 960 brass regulator was put in the line.

Results: No more interruption of kiln operation; no more shop time lost for lack of material. Another plant superintendent knows the value of Preventive Maintenance. Also knows the Crane Man can help him get most for piping maintenance dollars. Because Crane is not only the source of valves and fittings for every service, but of accurate information on their proper application as well.

This case is based on the personal experience of H. E. O., a Crane Representative in the St. Paul Branch.

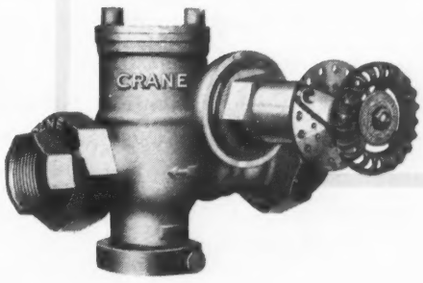
REDUCED PRESSURES KEPT AT STEADY FLOW WITH CRANE 960's

Cutting down pressure is only part of the job of pressure reducing. What you also want is a steady flow in the service line. You get both in these sturdy-built Crane No. 960 Brass Pressure Regulators for steam or air.

The 960 is ideal for Preventive Maintenance on modern process lines—on vulcanizers, cookers, driers, paper machines, air tools, air blasts, in heating systems.

Unlike ordinary reducing valves, the Crane 960 maintains reduced pressure at the point desired regardless of how much steam or air is being used. It will not permit pressure build-up when service line is idle.

Crane 960's are available for reduced pressure ranges of 5 to 30 pounds and 31 to 200 pounds. Operation is simple; ready accessibility permits easy inspection and servicing. In 6 sizes up to 2". Page 415 of your Crane No. 52 Catalog gives complete specifications.



1940 our 85th YEAR

CRANE

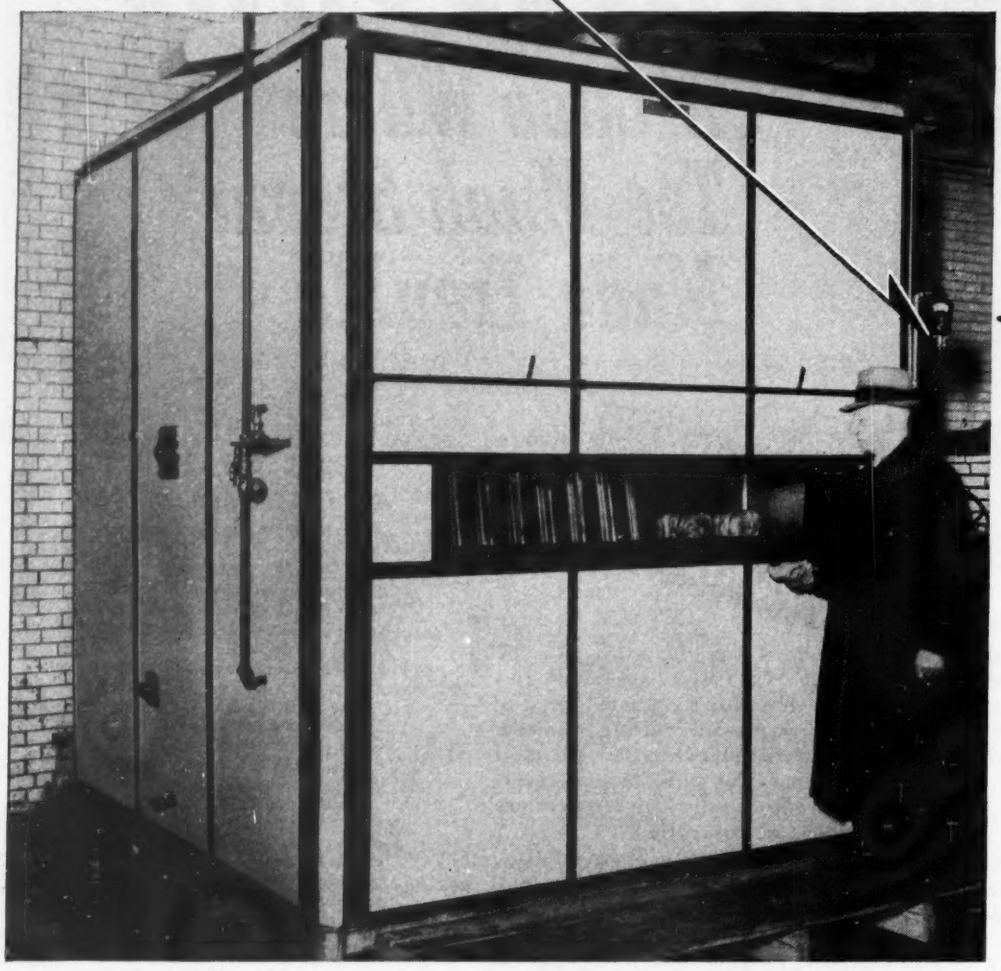
CRANE CO., GENERAL OFFICES: 836 S. MICHIGAN AVE., CHICAGO

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

NATION-WIDE SERVICE THROUGH BRANCHES AND WHOLESALERS IN ALL MARKETS

Close Temperature Control is Vital in Meat Processing

... *that's why Hunter Packing Co. uses* GAS *equipment*



Advance Gas-fired oven in plant of Hunter Packing Co., St. Louis, Mo.—one of two such ovens of 196 meat loaves capacity often in use 24 hours daily.

The curing and sterilization of meat loaves and similar products requires from four to six hours, and during the entire time the temperature must not vary more than two degrees.

That means close control.

The meat industry ranks among the heavy consumers of Gas because "Gas (as one manufacturer puts it) is the only reliable fuel that can be controlled to perform an outstanding result in the processing of meats."

With Gas, it is a simple matter to inject moisture into ovens during operation—a chemical advantage which prevents "humping" or "cracking."

• • • • • •

Wherever food processing requires heat, you will find Gas the preferred fuel because of its cleanliness, speed, economy and close controllability. Why not look into the advantages of Gas and the best modern Gas-fired equipment? Ask your Gas company for suggestions.

AMERICAN GAS ASSOCIATION

INDUSTRIAL GAS SECTION

420 LEXINGTON AVENUE, NEW YORK CITY

GUARDITE Moistening Process

"A New Important Unit Operation" ☆

FOR FOODS . . . CHEMICALS . . . TEXTILES

Guardite Moistening Process *adds* or *decreases moisture* in your materials . . delivers goods at the *desired temperature* . . free from insect infestation . . in *one* operation.

Guardite Mechanized Moisture Control is *accurate, speedy* . . automatic . . It has been uniformly successful . . *reduces cost* . . *saves time* . . *saves labor* . . *saves capital* . . assures uniform quality . . and widens your profit margin.

"A new and important unit operation in Chemical Engineering," the Guardite Moistening Process will add or decrease the moisture content of your material with accuracy of ¼ of 1%. It is applied either to raw materials entering production . . . or to the finished product . . . or to packages not hermetically sealed . . . whenever needed or most convenient to production.

Guardite is a single- or multi-step Cycle Process . . . requiring 20 to 60 minutes for the complete operation. . . . costs little to operate . . . requires only steam . . . electricity . . . water . . . and compressed air. It is automatic and "Fool Proof" . . . gives high capacity in a small floor area . . . reduces waste and uncertain results . . . uses a minimum of labor . . . no shifting and rehandling in large warehouses . . . the time required for moisture control is reduced from weeks to minutes . . . and the cost of moistening is reduced to as low as 15c per ton . . . with no harmful effect on color . . . taste . . . odor . . . or character of goods treated.

The Guardite Process delivers materials moistened uniformly throughout, whether in bulk, bags, barrels, cases or packages. The temperature of the material delivered can be determined in advance. You are assured of results of uniform quality and a material of uniform workability. Due to the conditions of temperature and pressure during the cycle, all insect infestation is eliminated.

Commercial units of the New Guardite processing units are now in successful operation . . . on a variety of products . . . producing up to 33 tons per hour . . . reducing waste . . . saving time . . . saving labor . . . saving capital . . . making unprecedented reductions in costs under old methods . . . and widening the profit margin.

A New Unit Operation ...Uniformly Successful

☆"The Guardite Corp. has made a number of applications of this procedure . . . the uniform success achieved would indicate that this vacuum process for goods conditioning is justifiably called a new and important unit operation of Chemical Engineering."

R. S. McBRIDE

Chemical & Metallurgical Engineering, Oct., 1938.

The following pages describe how Automatic Low Cost Moisture Control is accomplished by this New Unit Operation in Chemical Engineering . . .

Taylor Instrumentation and GIVES GUARDITE PRECISE, OPERATION and "FOOL-PROOF"

☆"When they have the tank charged and doors closed they push the starting button . . the automatic controls do the rest. "No picture can show the simplicity of the operation which has been made so nearly fool-proof.

"All of the controls for every part of the apparatus, except door opening and closing, are centralized on the instrument board.

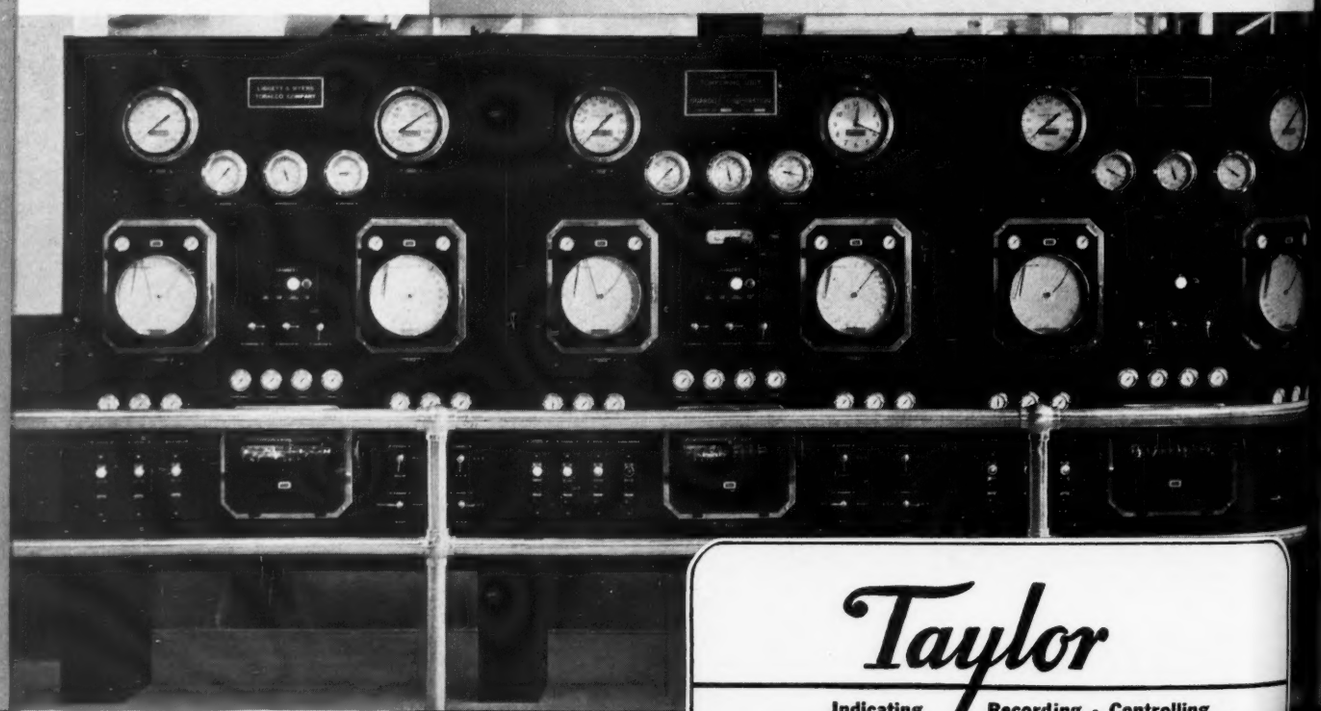
"Small indicating instruments make daily charts of pressures and temperatures so that permanent files may be kept of each lot of goods processed."

R. S. McBRIDE
Chem. & Met. Oct. 1938

The instrument panels here pictured are today actively on the job of controlling Guardite Moistening Units.

From the moment when the operator presses the "Cycle Start" button until he hears the rush of air as the vacuum is automatically broken at the end of the cycle Taylor Coordinated Instrumentation is at work, controlling time, temperature and pressure according to the predetermined cycle and safeguarding the valuable contents of the treating chamber.

Automatically the cycle runs its course and automatically it terminates, yet the human operator is not overlooked. Recording controllers, dial gauges and signal lights tell him at a glance the progress of the cycle; what valves are open, what motors are running, when the next batch comes out.



These three Taylor systems control three separate units, yet an interlock smooths out peaks in the total steam demand.

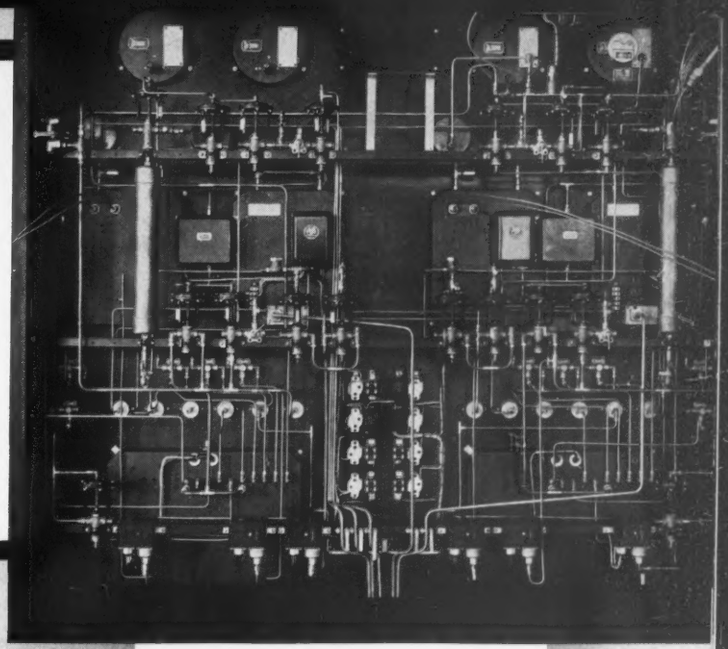
Taylor

Indicating / Recording • Controlling

TEMPERATURE, PRESSURE, FLOW *and* LEVEL INSTRUMENTS

Automatic Control

AUTOMATIC☆ SAFETY .....

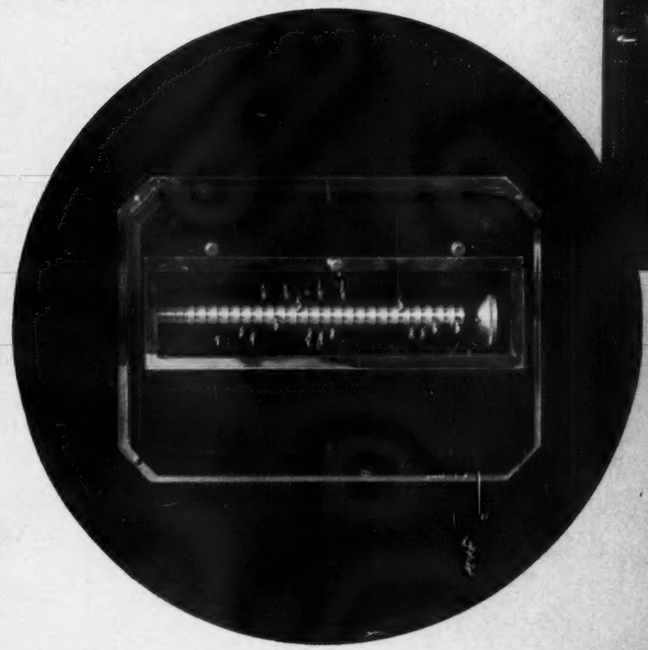


Behind the scenes on a Taylor-built panel which controls two Guardite units. These panels are shipped completely assembled and interconnected.

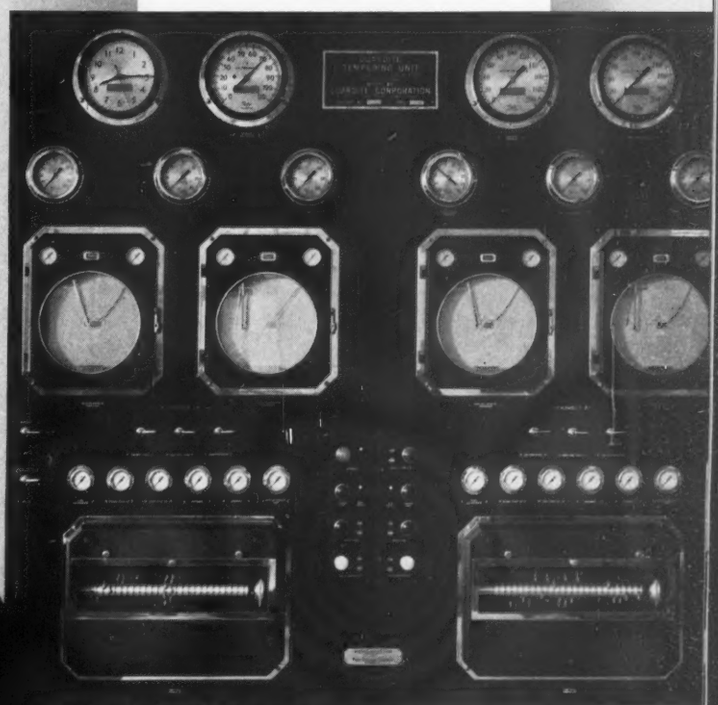
Provided also are numerous manual selectors and adjustments which permit any necessary changing of the cycle. It can be speeded up to get over a production peak or it can be delayed to compensate for changes in the incoming material.

Taylor coordinated control systems have been operating for over ten years in many industries and on a variety of process cycles. The knowledge of processing methods and of automatic control technique which underlies every Taylor system is available to you for the solution of your process control problem.

Flex-O-Timer



The Taylor Flex-O-Timer is a unique type of cycle controller. Flexible as to length of cycle, number of functions performed, and use of either air or electricity in the pilot circuits, it is being used in many industries.



Front view of the same duplex panel. The job is bossed by two Taylor Flex-O-Timers shown enlarged at the left. Each timer operates ten three-way air valves and three mercury bottle switches.

TAYLOR INSTRUMENT COMPANIES

ROCHESTER, N. Y.

Toronto, Canada, and London, England

Ingersoll-Rand Steam-Jets and Pumps Produce High Vacuum in GUARDITE Moistening

☆"The Guardite Equipment provides that as soon as the initial mechanical pumping brings the pressure down to a few pounds, the auxiliary "booster jets" are started.

"Mechanical vacuum pumps could perhaps draw that vacuum; but the time required would be excessive, and the capital much more, than by using a combination of mechanical and steamjet exhausters.

"Steam consumption for these units is somewhat greater per pounds of air removed at low vacuum, than for engine-driven pumps (though not at high vacuum).

"The evacuating capacity which can be achieved with a minimum investment cost, far outweighs this slightly greater operating item."

R. S. McBRIDE
Chem. & Met. Oct. 1938.

Ingersoll-Rand vacuum equipment is an essential part of each Guardite moistening unit. On a typical unit the equipment includes a large high-vacuum first-stage ejector; a direct-contact condenser; a smaller second-stage ejector; a surface intercondenser and either a third-stage ejector or a reciprocating vacuum pump as illustrated in the lower right hand corner.

Operating in the Guardite cycle, the Ingersoll-Rand three-stage vacuum equipment—

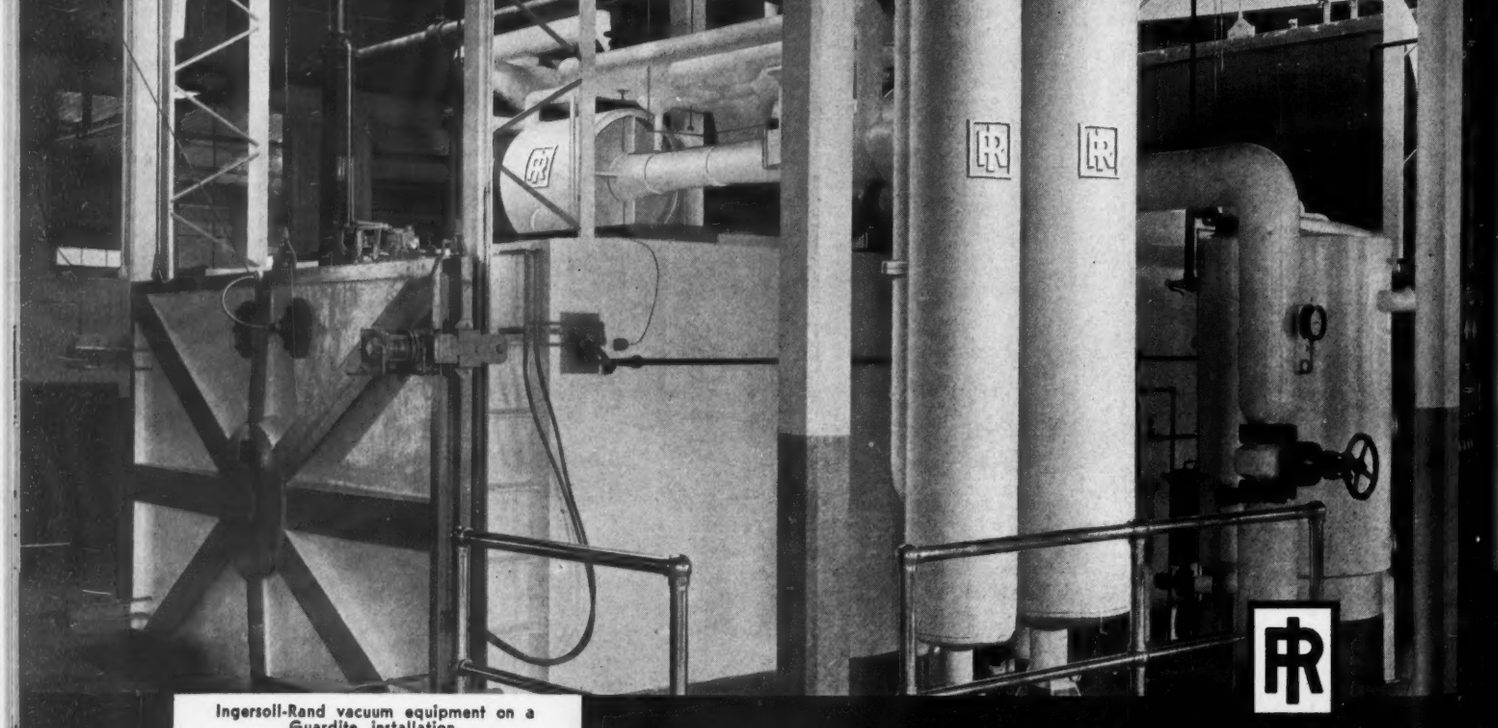
(1) Evacuates the air from the treating chamber.

(2) Produces a sufficiently low absolute pressure to boil or flash moisture in the product being treated.

(3) Re-evacuates steam from the treating chamber following an injection of water and steam (micro-mist).

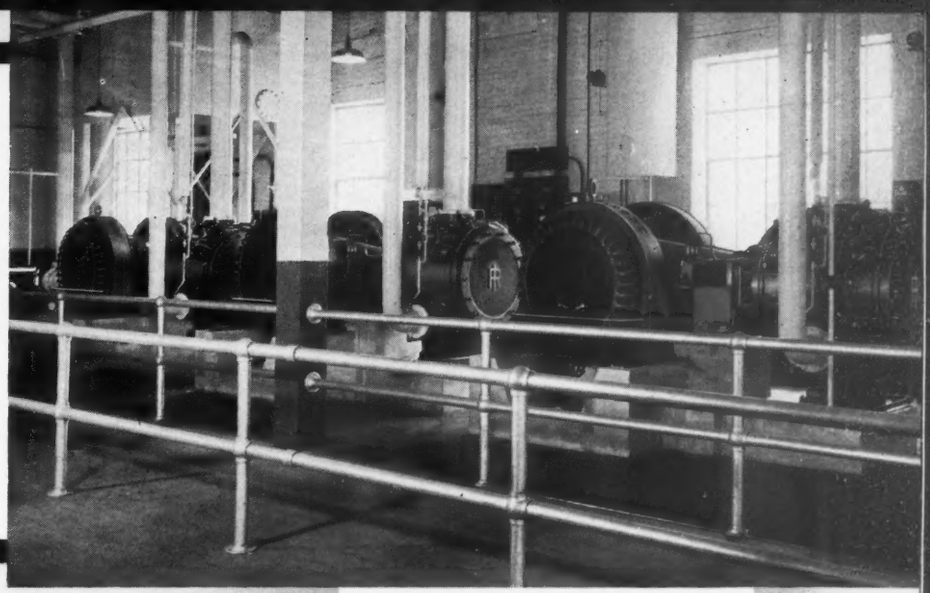
(4) Finally, re-evacuates steam to bring the product to a predetermined finishing temperature.

Selection of vacuum equipment, to perform these duties, is influenced by controlling local conditions. Steam jet ejectors are used for the first two stages because they are the only type of vacuum pump which can economically handle large quantities of air and water vapor at low absolute pressure. Choice of an ejector or



Ingersoll-Rand vacuum equipment on a Guardite installation.

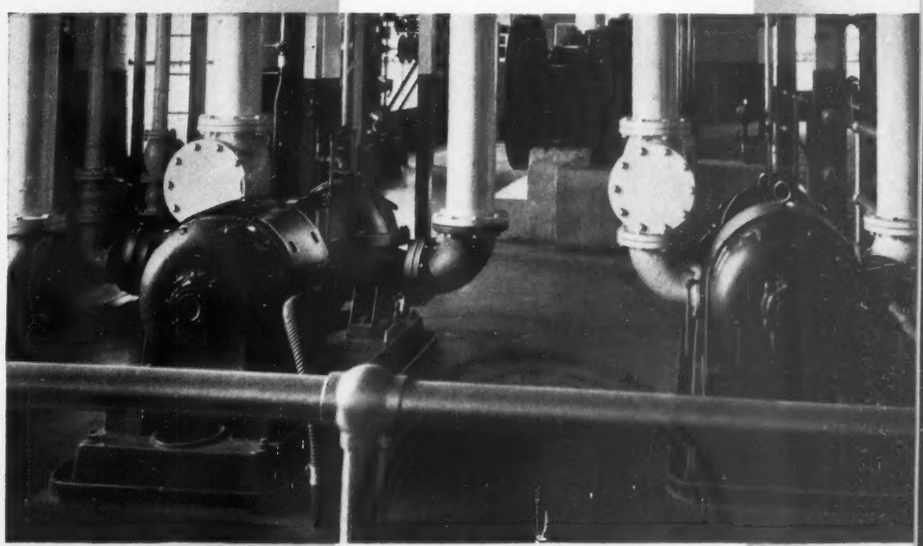
Vacuum at Low Cost* Units . . .



I-R Synchronous motor-driven reciprocating vacuum pumps used on three Guardite units.

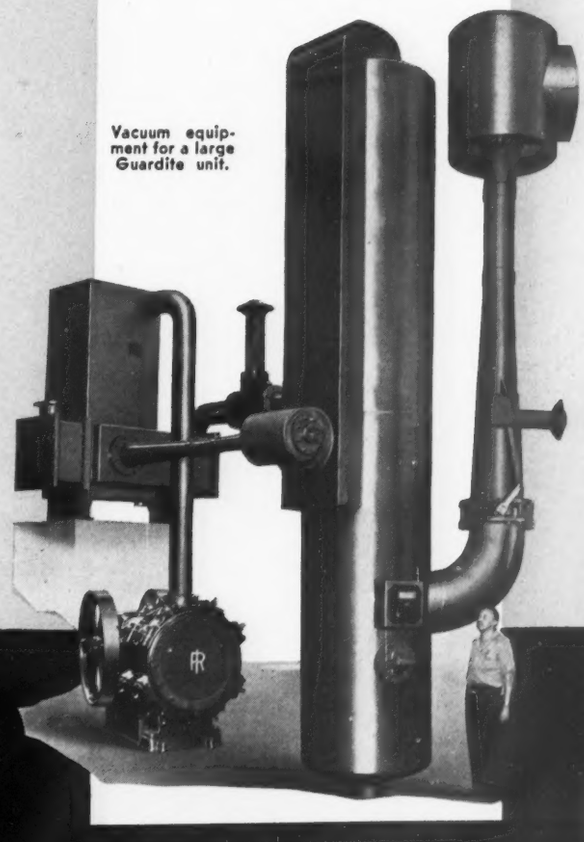
reciprocating vacuum pump for the third-stage depends primarily on the relative cost of steam and electric power. Severe operating conditions, fluctuating loads and low first-cost require the use of a direct - contact Disc - Flow Condenser equipped with suitable control of water flow. The intercondenser may be of either the direct-contact or surface type, depending upon the cost of cooling water. Centrifugal pumps for removal of water from the direct-contact condensers must be selected to perform satisfactorily under variable suction conditions.

These and many other factors entering into the engineering and selection of equipment require close cooperation with the Guardite Corporation. Since Ingersoll-Rand is one of the few builders of complete lines of steam jet ejectors, condensers, reciprocating vacuum pumps, and centrifugal water pumps, all of which are required in Guardite units, cooperative problems are simplified.



Two of three I-R centrifugal water removal pumps serving three Guardite units.

Ingersoll-Rand has attained an outstanding position in the application of vacuum apparatus to process work through wide experience with processes of all types, and has complete manufacturing, research and test facilities. All of these resources lead to the selection of the most suitable equipment to assure economical and reliable operation.



Vacuum equipment for a large Guardite unit.

OTHER I-R PRODUCTS FOR PROCESS CONTROL

Compressors for Air or Gas

Electric, Belt, Steam Turbine, or Engine Drive. All pressures and Vacuums.

Pumps for All Liquids

Motor, Turbine or Engine Drive. Pressures up to 3,000 lbs. Capacities to 100,000 gpm.

Vacuum Equipment

Steam-Jet Ejectors, Surface and Barometric Condensers, Steam-Jet Water Vapor Refrigeration, Reciprcating Dry Vacuum Pumps.

Turbo Blowers for Air or Gas

Motor or Turbine Drive. Pressures, ½ to 110 lbs. Capacity, 100 to 100,000 cfm.

Ingersoll-Rand also builds Diesel and Gas Engines, Rock Drills, Air and Electric Hoists and Pneumatic Tools of every description. Call the nearest branch office or write for bulletins on any Ingersoll-Rand Products.

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Seattle
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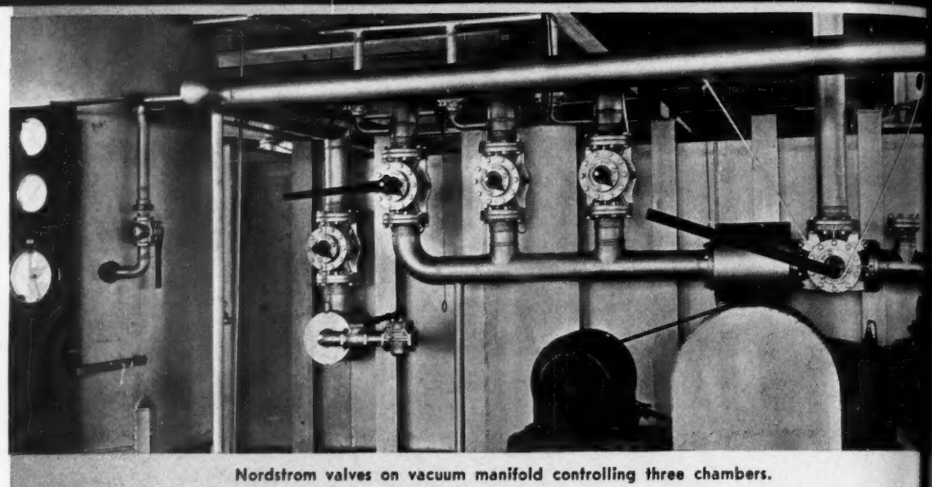
Washington

Guardite Process Maintains HIGH VACUUM with *Nordstrom* VALVES☆

☆"The installation provides a completely automatic control for the operation of this equipment. A series of cams on a single shaft actuates in proper sequence small air-controlled units, which in turn, open and close the large air-operated valves on each part of the equipment.

"When treating free flowing material, the conditioner is built in the form of a cylindrical tank with hopper bottom. The goods to be treated then flow in and out by gravity, being delivered above and removed below by suitable belts and conveyors. In such cases, air-operated valves replace doors, but the fundamental nature of the cycle operation is the same."

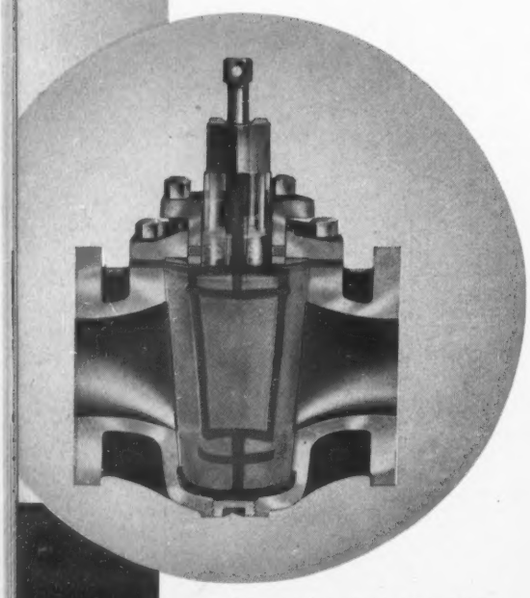
R. S. McBRIDE
Chemical & Metallurgical Engineering, October 1938



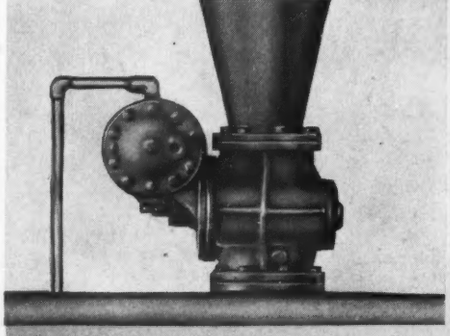
Nordstrom valves on vacuum manifold controlling three chambers.

The successful operation of the Guardite Moistening Process depends largely upon the maintenance of a high vacuum on all operating lines. This high vacuum, necessary for efficient and economical operation, cannot be produced where line factors, such as valves, permit even infinitesimal leaks. Early in the development of this process, the engineers for The Guardite Corporation realized that it would take an exceptional product to perform under these exacting conditions. They found in the Nordstrom Valve the absolute leak resistance required. They learned also that Nordstrom's have given years of satisfactory service on lines in radio tube and electric light bulb plants where the least deviation from the high prescribed vacuum would result in ruination of the product.

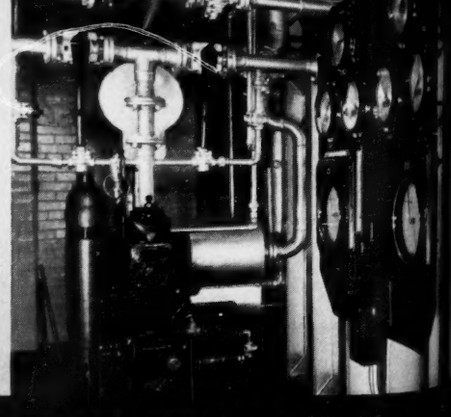
In addition to inherent resistance to both internal and external leakage, the Nordstrom Valve is a "natural" for this service, due to its quick, easy, quarter-turn, non-sticking operation. For automatic control, as is a part of the Guardite Process, they can be fitted with air cylinders (as are used here) or a variety of motor controls.



Cross section of Nordstrom Valve.



12" Air-operated Nordstrom vacuum breaker valve on large Guardite Moistening Unit.



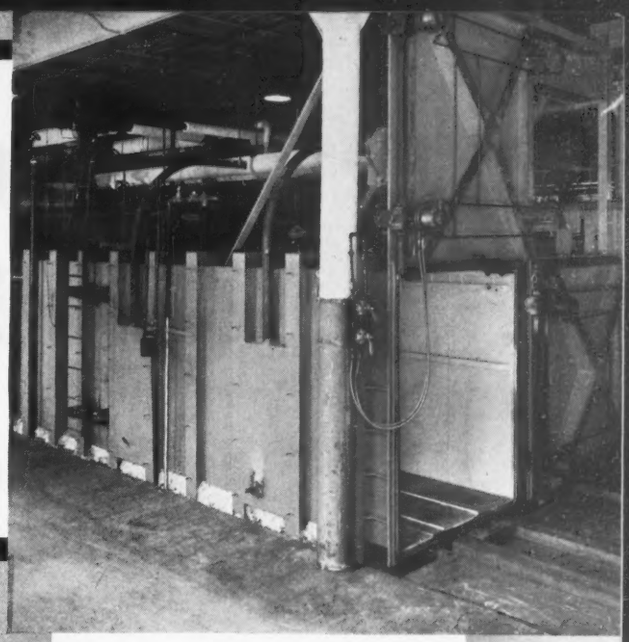
MERCO NORDSTROM VALVE COMPANY

A Subsidiary of Pittsburgh Equitable Meter Company

Main Offices: 400 Lexington Ave., Pittsburgh, Penna.

Branch Offices in Principal Cities

Chicago Bridge & Iron *Fabricates*☆ GUARDITE Moistening Units . .



The vacuum chambers for Guardite installations are fabricated of welded construction in one of the three shops of the Chicago Bridge & Iron Company or in the plant of our Canadian affiliate, the Horton Steel Works, Limited, at Fort Erie, Ont. The units are installed complete, ready to operate, by experienced field crews.

All welding, both in the shop and the field, is done by operators who have passed strict qualification tests. All work is done under constant, close supervision and inspection, and test plugs are cut periodically from the actual seams welded by each operator.

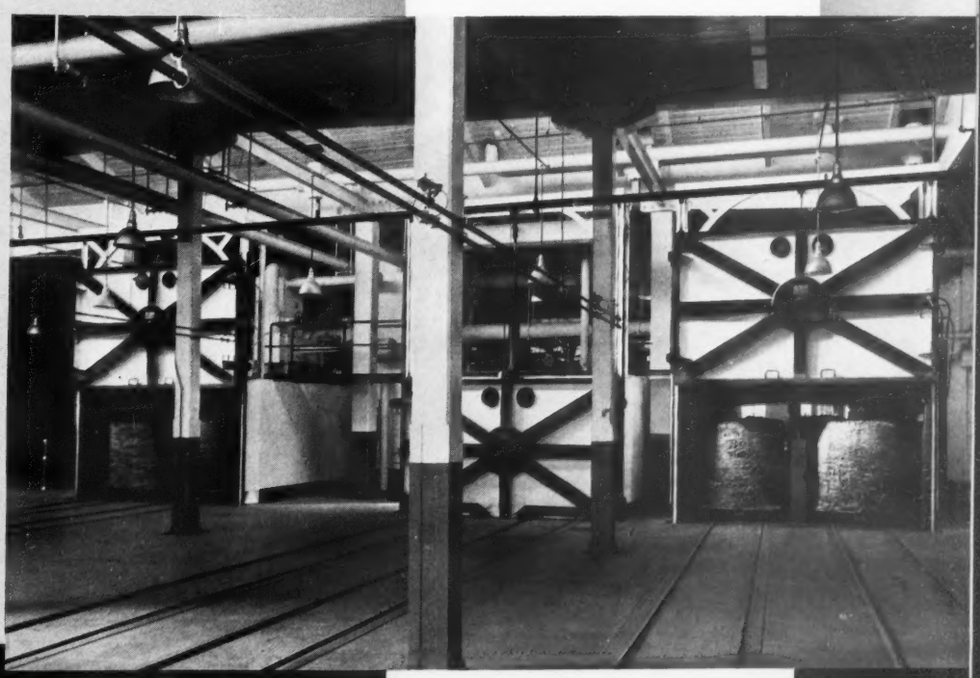
Our experience in building of spherical, spheroidal and cylindrical pressure tanks, water tanks and other special shaped vessels serves as a background in the designing of Guardite chambers, assuring you of adequate, rugged construction for this high vacuum process. This is particularly advantageous as Guardite installations are designed especially for each individual product. Seldom, if ever, are any two the same size, shape or arrangement. They are built in varying sizes and proportions, and, furthermore, the chambers may be rectangular, cylindrical or hopper bottom, whichever handles your product most efficiently.

In addition to Guardite chambers and other types of pressure and vacuum vessels, we build elevated water tanks and flat-bottom storage tanks in a complete range of standard sizes. Automatic equipment for fabricating, grit blasting and coating steel pipe 24 in. diam. or larger is located at our Chicago plant. All three of our shops are equipped to build pressure vessels to API-ASME specifications and the Birmingham plant has facilities for x-raying and stress relieving units up to 14 ft. diam. and of any length that can be shipped. Write our nearest office for estimates.

☆"Tanks are built of steel plates, with stiffening ribs around the outside, welded fast to hold the plate in shape against the pressure of atmosphere when the tank is evacuated. The closure at either end is by a large ribbed steel door which seats against a double V-type rubber gasket set in the door flange of the tank.

"It requires only a few seconds to open the doors."

R. S. McBRIDE
Chem. & Met. Oct. 1938



Discharge end view of Guardite Moistening Unit showing air-operated vacuum-tight doors.

CHICAGO BRIDGE & IRON COMPANY
332 So. Michigan Ave., CHICAGO, ILL.

Birmingham Boston Cleveland Dallas Detroit Houston Los Angeles New York Philadelphia San Francisco Tulsa Havana

PLANTS IN BIRMINGHAM, CHICAGO AND GREENVILLE, PA.
In Canada: HORTON STEEL WORKS LIMITED FORT ERIE ONT

The Guardite Moistening Process *has been Thoroughly Tested and Successfully Applied*☆

The Guardite Moistening Process has been thoroughly tested and successfully applied.

Built to any size . . any capacity needed . . Guardite may help you speed production . . reduce costs . . improve quality . . increase profits . . by Mechanized Moisture Control . . an easy check-up will show . .

Years of experimental work . . on pilot plants . . covering a wide variety of Foods . . Chemicals . . and Textiles . . and years of operating results from production plants . . uniformly endorse the success of the Guardite Process. Units are designed and built to the specifications and patents of the Guardite Corporation . . pioneers in vacuum moistening and vacuum fumigation processes . . and are available in any size . . to any capacity for any production required . .

Get our facts on this "New Important Unit Operation" . . Check against your present methods . . and your present costs . . Furnish us the following simple data . . we will willingly estimate on a Guardite Unit to exactly fit your needs . . without any obligation. (It will be easy to fill in the questions below) tear off and mail them today, attached to your letterhead and include your name.

(a) Goods to be treated

1. Quantity_____
2. Initial moisture content_____
3. Final percent of moisture desired_____
4. Temperature desired_____
5. Is sterilization required_____

(b) Steam

1. Amount available_____
2. Pressure_____
3. Amount of superheat_____
4. Nearest source_____
5. Cost_____

(c) Water

1. Amount available and pressure_____
2. Temperature_____
3. Cost_____
4. Source: well_____
   city_____
   cooling tower_____

(d) Electricity

1. Characteristics_____
2. Cost_____

(e) Compressed air

1. Pressure_____

(f) Drain or sewer

1. Size and location of nearest connection
   _____

(g) Floor

1. Type: Concrete_____
   Wood_____
   Steel Plate_____
2. Sketch of space_____
3. Carrying capacity_____

(h) Location of unit in building

Height of building_____

(i) Erection

1. Size doors through which equipment must pass_____
2. Elevators —
   (a) Size_____
   (b) Capacity_____
3. Size of windows_____
   _____

Uniformly Successful for Foods, Chemicals and Textiles

☆"Great emphasis should be placed on the general nature of this method of goods conditioning . . a procedure which can presumably be equally well applied to almost any . . bulk package of industrial goods.

"The principle of eliminating fully the non-condensable atmosphere in order that moisture will have immediate access to every part of such a mass, is fundamental. Using that patented principle, chemical engineers will presumably be able to process almost any type of material.

"The Guardite Corp. has made a number of applications of this procedure, with uniform success."

R. S. McBRIDE
Chem. & Met. Oct. 1938.

The GUARDITE CORPORATION

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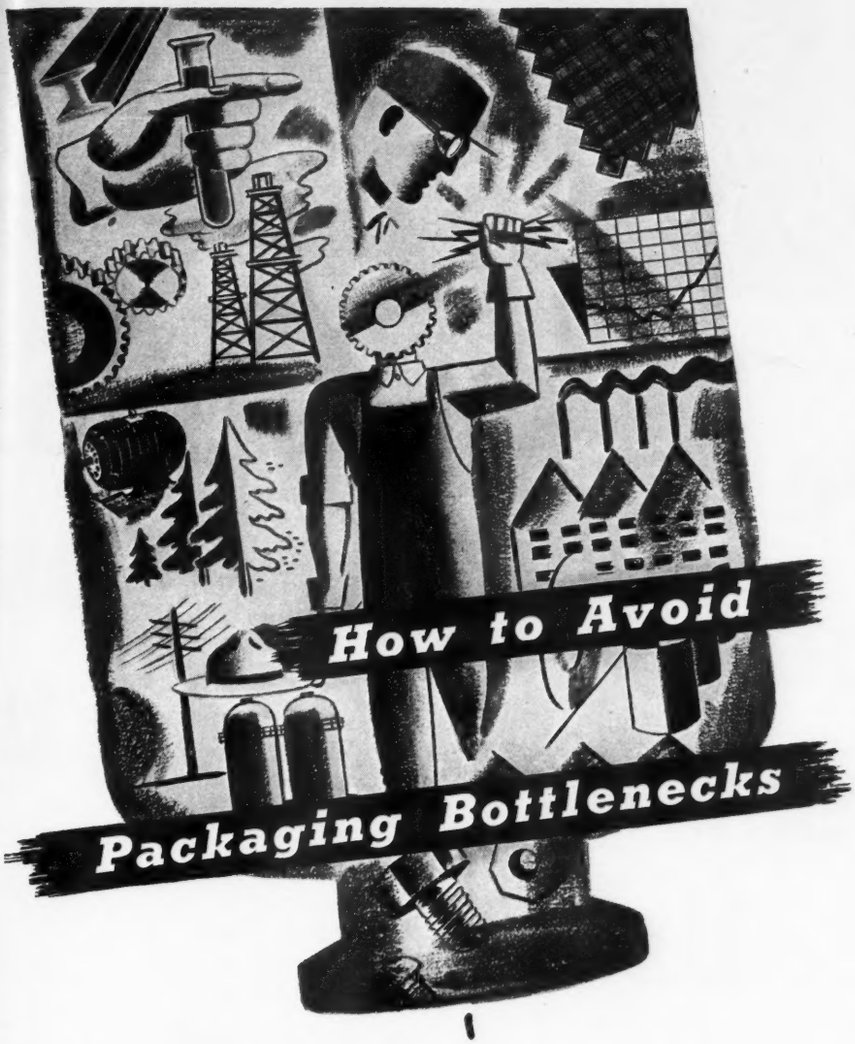
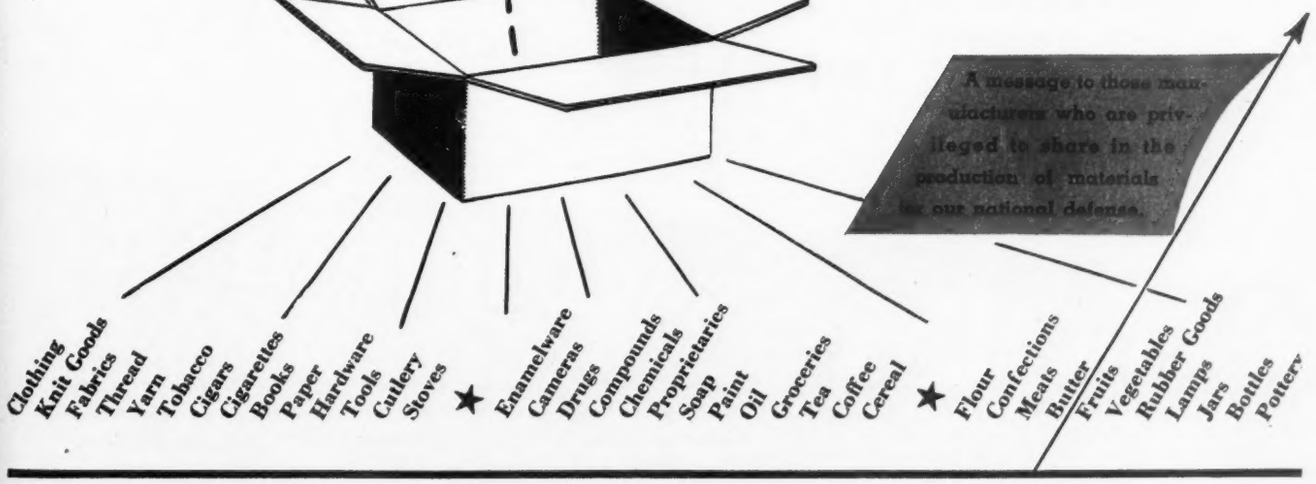


Perhaps you've faced the problem already. If not, you're quite likely to meet it soon. Packaging requirements geared to less-than-capacity production can constitute a serious "bottleneck" when called upon to meet the cry of "More! Faster!"

★ ★ ★

What to do about it? Write, wire or phone the nearest office of H & D. *Immediately* a Package Engineer will come to your plant for a survey of the situation, an analysis of the problem. *Immediately* all the facilities of the H & D Package Laboratory will be available. *Immediately* you'll get a solution embodying the skill and experience acquired through many years of pioneering achievement in packaging techniques. *HINDE & DAUCH*, Executive Offices 4009 Decatur St., Sandusky, Ohio.



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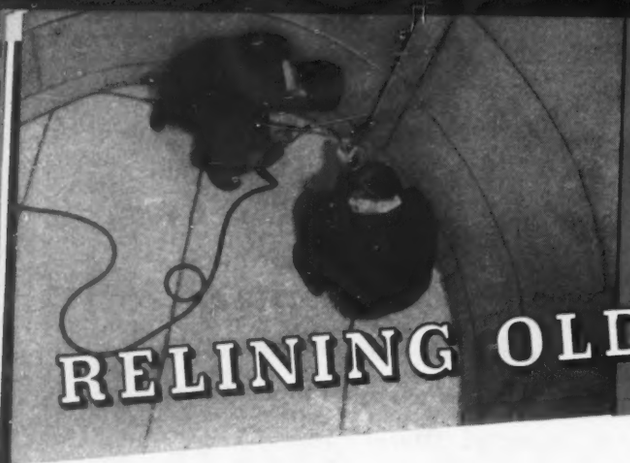


RELINING OLD EQUIPMENT

There are So Many Jobs Where You Can Cut the Cost of Stainless Equipment by Using *

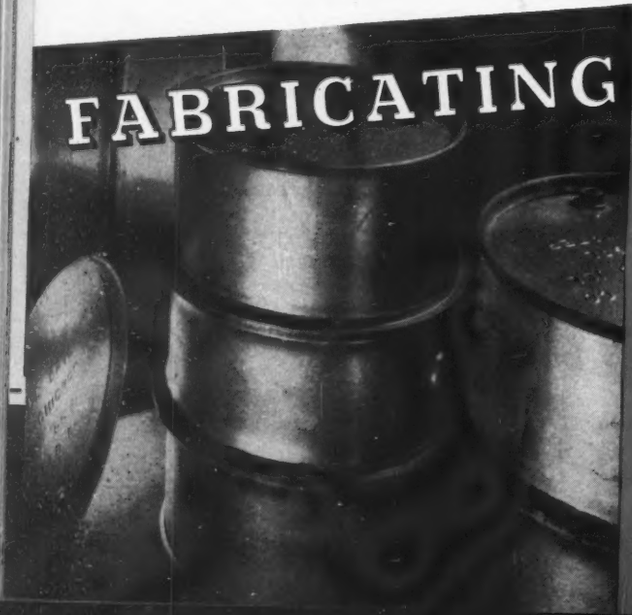
* Just a few ar... shown on th... opposite pag...

Trade Mark Reg.

INGACLAD

STAINLESS-CLAD STEEL

"A Borg-Warner Product"



FABRICATING NEW EQUIPMENT

If you have a corrosion problem in your plant, or in the storing or transportation of your product, see how much more economically you can solve it with IngAclad Stainless-Clad Steel. For nearly ten years, this Borg-Warner achievement in steel has stood the severest tests in actual use. By inseparably bonding finest quality Stainless Steel on to Soft Steel, we greatly reduce the material cost. Yet give you perfect Stainless protection on the contact side.

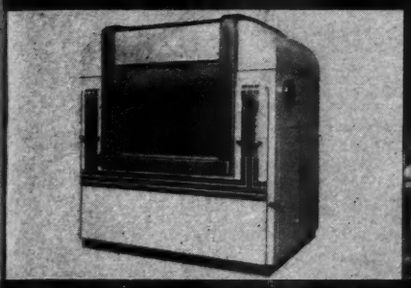
Write for Special IngAclad Folder

INGERSOLL
STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago, Illinois
Plants: Chicago, Illinois; New Castle, Indiana; Kalamazoo, Michigan

Cereal Cookers fabricated from IngAclad by Leader Iron Works, Decatur, Ill.

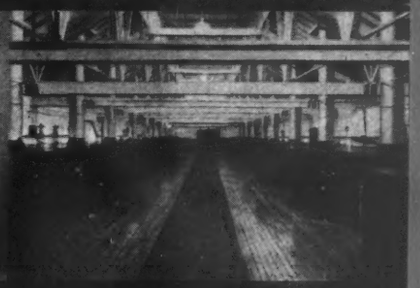
Golden corn syrup is protected in both color and flavor by having these large tanks lined with IngAclad SHEETS.

One of the country's largest process industries recently had these nine concrete bins lined with IngAclad 16 gauge Stainless-clad steel. Each bin 20 ft. x 35 ft.

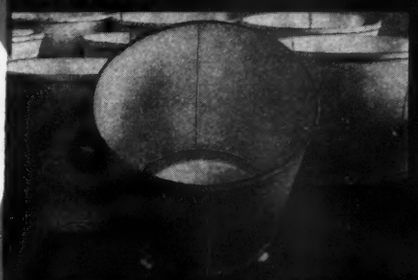


Stationary Bowl Dough Mixer manufactured by Baker, Perkins, Inc., Saginaw, Mich. The interior surfaces and door are of IngAclad Plate.

A large sugar refinery obtained the stainless service required at large savings in material cost, when they used IngAclad for this rotary cooler, 44 ft. long by 7½ ft. in diameter.



Soap Kettles lined with IngAclad. Fume stacks are also of light gauge IngAclad.



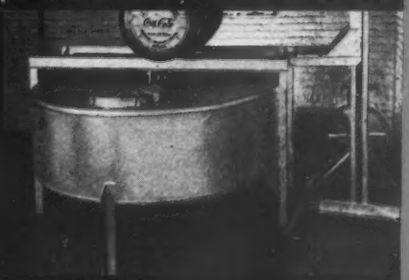
A leading manufacturer of paints and varnishes, demanding good heat conductivity and freedom from all discoloration, had these direct-fired kettles fabricated from IngAclad.

A Partial List of Other Users of IngAclad Includes:

American Cyanamid Co.
Armour & Co.
Corn Products Refining Co.
Dow Chemical Co.
Fleischmann Co.
General Foods Corp.
Hercules Powder Co.
Andrew Jergens Co.
Monsanto Chemical Co.
Northwest Paper Co.
Procter & Gamble Co.
Sherwin-Williams Co.
Standard Brands Inc.
United States Potash Co.

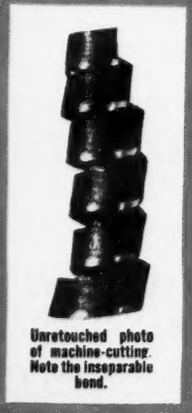
Clay Emulsion Mixing Tanks, each 6 ft. in diameter, 5 ft. high, fabricated of IngAclad by Fox River Boiler Works, Appleton, Wis., for Fox River Paper Co. of that city.

Table Tops of 11 gauge polished IngAclad, used by Highway Testing Laboratory, U. S. Department of Agriculture.



500-gallon Coca-Cola syrup storage tank fabricated of 12 and 14 gauge IngAclad Stainless-Clad Steel. All interior surfaces polished.

INGACLAD OFFERS THE BROADEST SERVICE IN THE NON-CORROSIVE FIELD



Unretouched photo of machine-cutting. Note the inseparable bond.

No other one source offers you all these . . . Solid Stainless Sheets and Plates . . . Nickel-Clad Sheets . . . IngAclad Stainless-Clad Sheets and Plates . . . Heat-resisting Alloy Sheets.

Write, wire or 'phone for Ingersoll Representative to call.

INGACLAD Trade Mark Reg.

STAINLESS-CLAD STEEL

is available in Sheets 8 to 18 gauge; in Plates 3/16" to 1¼". Regularly supplied with 18-8 Stainless, but also available in other analyses, INCLUDING NICKEL-CLAD SHEETS.

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Ingersoll Steel & Disc Division, Borg-Warner Corporation,
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Send us Blue Prints of Lining Procedure and Folder, with complete information about IngAclad for following uses:

☐ **Relining Old Tanks** ☐ **Table Tops** ☐ **Shipping Containers**
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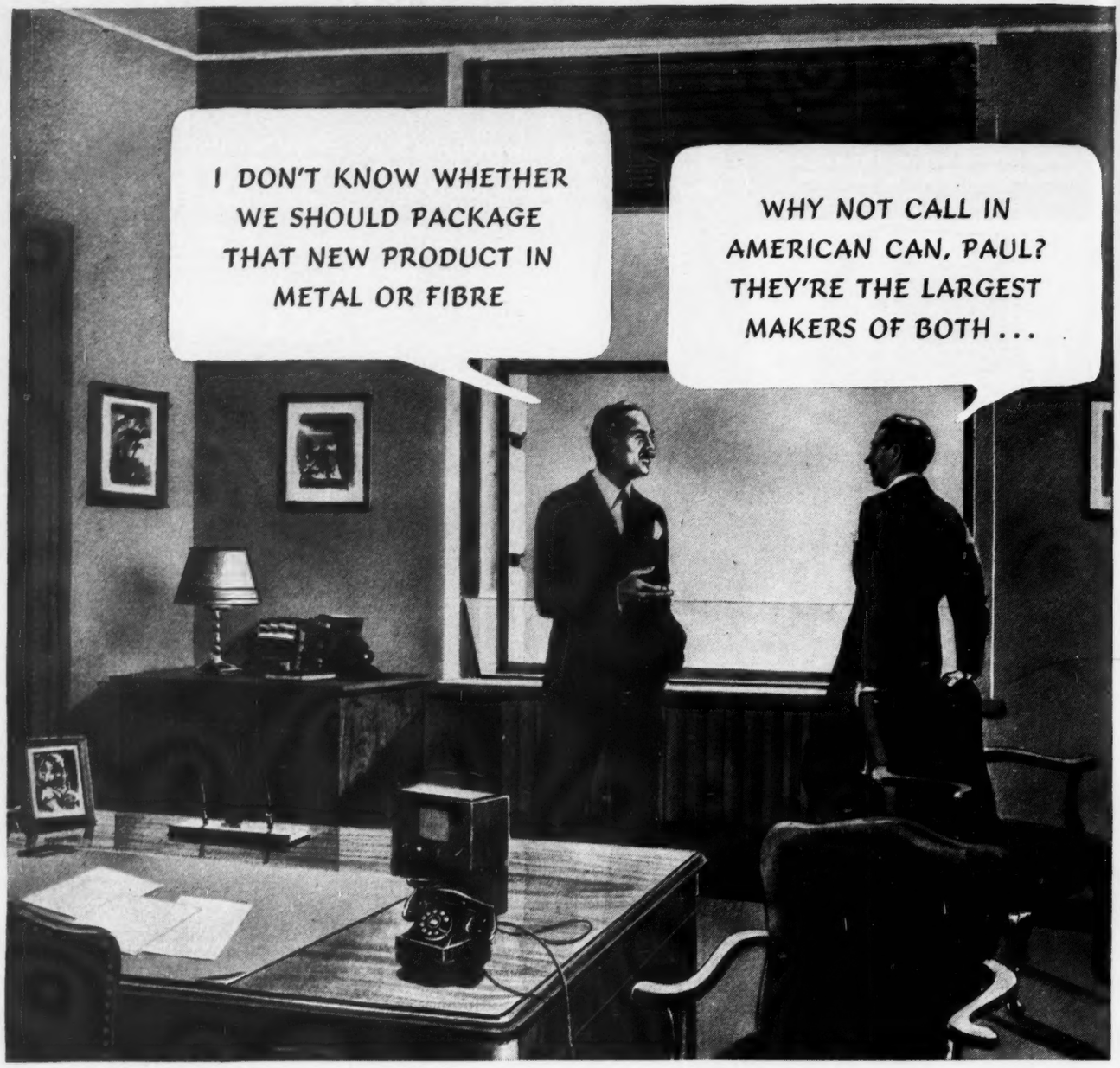
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WHY NOT CALL IN AMERICAN CAN, PAUL? THEY'RE THE LARGEST MAKERS OF BOTH . . .

"The way I look at it, the man who has the best perspective is likely to have the soundest judgment. American Can has had the widest experience in both metal and fibre containers. That's important to us. Then, too, they can be unbiased in their judgment, because they make *both*. Either way we go, we'll have the benefits of their research and their resources. Let's study the problem with them."

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AMERICAN CAN COMPANY, 230 PARK AVENUE, NEW YORK, N. Y.
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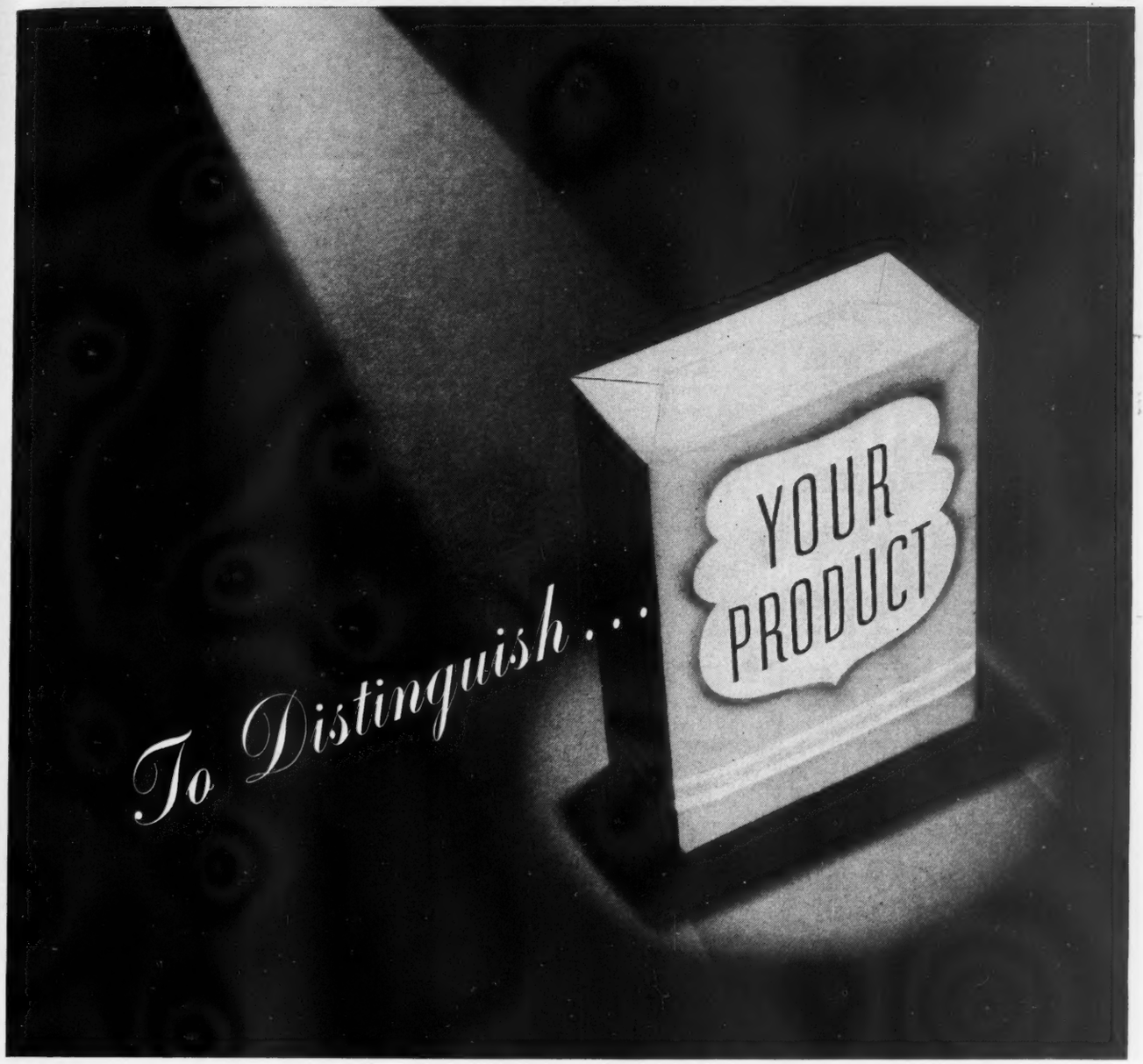

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With pure *crystalline* Vitamin B_1 available in commercial quantities it is now economically and technically practicable to correct the heavy losses of this important vitamin which are necessarily incurred through modern methods of food processing.

Vitamin B_1 Crystals Merck are ideally adapted to incorporation in a variety of food products. By using this pure crystalline substance, problems of odor, taste, color, and bulkiness are completely eliminated.

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GET FACTS—Write Today for Details on

"HOW TO FORTIFY FOODS" the Natural Way with

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STABILIZED WHEAT GERM

A NATURAL SOURCE OF VITAMIN B_1

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For use in pharmaceutical and food products—Now available for general distribution.

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For condimentation of all food products

Also a complete line of
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Tapioca Flour	Rice Starch
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CARROT OIL

—the rich golden-yellow oil (Carotene) from carrots containing 25,000,000 (twenty-five million) Vitamin A units of Carotene per pound.

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Also producers of wheat germ oil and ThiaBee, a stabilized wheat germ product rich in Vitamin B_1, or thiamin.

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These vitamin products are of particular interest to many food product manufacturers. Inquiries are invited. Literature, prices and samples to firms requesting same on their letterheads.

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"There is a COCOA for Every Purpose."

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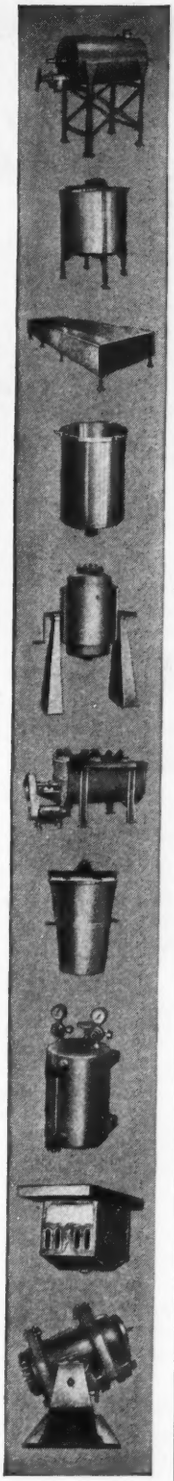

When Production Steps-Up Your Equipment Must Be Able To Meet It.

Many leading food manufacturers are wisely getting together with KOVEN now for equipment that will be able to take on the Up in Business efficiently—economically . . . KOVEN-IZED Equipment. This equipment is designed by widely experienced engineers to meet each manufacturer's *individual* production requirements and it is fabricated by expert workmen in all the leading commercial and non-corrosive metals.

'Phone or write for a KOVEN engineer to call and advise you concerning your equipment needs without obligating yourself in any way.

Among the many KOVEN products:

Stainless Steel
Aluminum Sheet Fabrication
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Chemical Apparatus
Coils and Pipe Bands
Copper Sheet Fabrication
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Kettles, All Types, All Metals
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Pails, Special Heavy
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Tables, Galvanized or Monel
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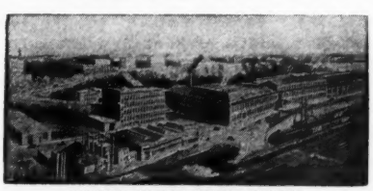
WATERFILM Industrial Heating Boilers

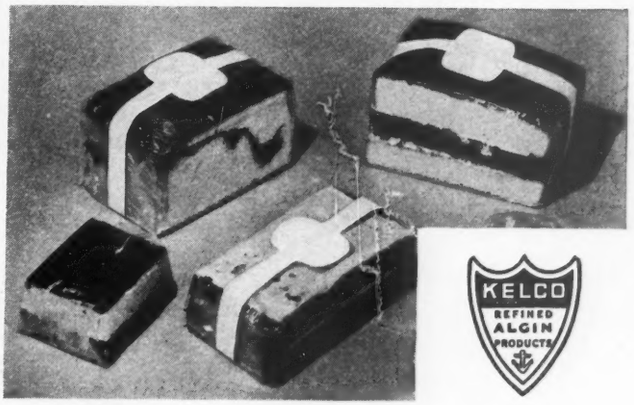


KOVEN NEW JERSEY PLANT

L. O. KOVEN & BRO. INC.

154 Ogden Avenue
JERSEY CITY, N. J.

Use KELTOSE in *your* ICINGS and TOPPINGS



Advantages:

Icings will NOT stick to wrapper	*Icings set quickly*
Tendency for syrup separation is reduced effectively	*Running and melting of icings or toppings is checked*
Only a very small amount is required	*There is no separation—no cracking or shaling*

KELTOSE—one of KELCO Algin Products—is now in regular use in prominent bakeries. It is a very effective water-holding material for use in stabilizing icings and toppings which set quickly and will not stick to the wrapper. They are light, tender in body and show no tendency on aging to become rubbery in texture. There is no running, melting, or syrup separation.

Being tasteless, KELTOSE does not cover or mask, or in any way detract from the true taste of the finished product. Only a very small amount is required, often as little as 1½ oz. to 100 lbs. of icing or topping.

Why not try KELTOSE in your confectionery products? A sample and complete information on request.

Use *These* Other KELCO Algin Products

There is a KELCO Algin Product to meet every stabilizing or suspending requirement—DARILOID to stabilize ice cream; COCOLOID to suspend cocoa fibre in chocolate drinks, etc.

Try KELCO Algin Products in your food processing. You'll like them.

KELCO COMPANY

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STOPS TROUBLE

STRAIGHT LINE FLOW ELIMINATES TURBULENCE . . .

Gets HIGHEST VALVE CAPACITY

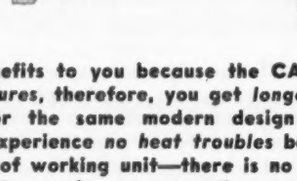
From inlet to outlet the fluid flows through this valve in a straight line — a streamline — almost as though there were a pipe running through the valve housing for the fluid to flow through. There is no detour around a dividing wall—the direction of flow is not changed at right angles because of a seat wall — also, the flow is not broken up by valve stems, springs, or other parts. The net result is NO TURBULENCE, hence MORE CAPACITY.

CASH STANDARD
Streamlined
TYPE 1000 PRESSURE
REDUCING VALVE
. . . GIVES YOU UNUSUAL EFFICIENCY PROVIDED BY THE STRAIGHT LINE FLOW OF AIR-STEAM-WATER-OIL AND OTHER LIQUIDS AND GASES THROUGH THE VALVE

SHOWING HOW THIS VALVE INCREASES PERFORMANCE RESULTS BY ELIMINATING TURBULENCE . . . .

. . . . AND HOW YOU ELIMINATE THIS TURBULENCE

There is only one vital moving part—the seat piston which is opened in a positive manner by the force of the initial pressure and closed in an equally positive manner by the force exerted by the delivery pressure on the diaphragm. This simple construction of this valve handles surprisingly dirty and heavy fluids without clogging.



The high pressure entirely confined to the small inlet chamber (cross hatched section) makes this valve good for initial pressures up to 3000 lbs. The valve is furnished in sizes from ¼"x ¼" up to 2"x2½" inclusive. For delivery pressures below atmosphere a special diaphragm spring arrangement is used.

because

- ★ IT IS SO SIMPLE
- ★ HAS NO COMPLICATED PARTS TO GET OUT OF ORDER
- ★ NO SMALL PORTS OR PASSAGES TO CLOG UP
- ★ THERE'S NOTHING TO KEEP IT FROM WORKING DEPENDABLY

USERS

THE MEN WHO KNOW— MAKE THESE ENTHUSIASTIC

STATEMENTS

Constant reduced pressure—no trouble

"Your Streamlined Valves hold a constant delivery pressure no matter how much variation we have in flow or in the supply pressure. That is the reason why we have been buying them right along—and why it is our intention to continue to buy them; and we might also add that they have not given us any trouble." *Case No. 138*

Busy Laundry reports no shutdown in three years

"Your Streamlined Valve is used to serve a water heater in our laundry here. Because the heater is loaded to capacity, we could not afford to take chances on time out for valve repairs. That is why we used your Valve on this job. And after about three years without a single moment of trouble we are mighty pleased." *Case No. 153*

Steady control—constant reduced pressure —no build-up

"We must have steady control on the low side of our regulators and also keep the pressure constant. We can't afford any build-up. These Streamlined Valves have been the answer to our long-standing problem." *Case No. 145*

Three years use—no trouble whatsoever— this service is remarkable

"Our records show that the first Streamlined Valves we bought from you have been in about three years and to date we have had no trouble whatsoever. In Reducing Valves this service is remarkable." *Case No. 179*

Not looked at in four years

"Oh yes, I do recall that Streamline Valve now. I remember installing it myself about four years ago, but that's all I can tell you about it because I haven't had to look at it since." *Case No. 219*

Think of the benefits to you because the CASH STANDARD does stop trouble. You have *no failures*, therefore, you get *longer service*—reason—simple, rugged construction. For the same modern design reason—costs for attention are *decreased*. You experience *no heat troubles* because the heat is confined to the tubular passage of working unit—there is no flow through the separate control chamber—no piston spring or any other spring is exposed to the fluid under control.

Because of the streamlined flow, you are easily able to meet peak demand and yet hold the pressure constant at the same time. You get correct flow when you need it most. No turbulence is set up and therefore operation is smoother—you have no flow variation—you have constant, dependable action—you experience no spoilage results due to pressure variation.

Should replacement become necessary after long service all you need do is order inexpensive replacement parts and install them yourself right in your own plant.

There's the right type CASH STANDARD Streamlined Valve for your service conditions. Any combination of metals can be obtained for body trim, valve seat, and seat ring. Handwheels for quick pressure adjustment also available.

30-DAY TRIAL *Free* OFFER

Write for details on this special offer made to give you an opportunity to find new ways to save money.

SEND FOR BULLETIN 1000

A. W. CASH COMPANY

DECATUR, ILLINOIS

CASH STANDARD
CONTROLS . . VALVES

Bring Your Equipment Data Files Up to Date!

Here are the latest facts and figures available about food handling, processing and packaging equipment, in well illustrated Catalogs and Bulletins—full of data you want to have on tap—sizes—capacities—ratings—etc. etc.

It's all yours for the asking—and we've made it easy to ask. Just look over this list of *new* Catalogs and Bulletins—check the numbers as you go along of the ones you'd like to have. Then circle the corresponding numbers on the post card on page 130—add your name and address—and mail not later than December 31st—preferably today.

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2. PACKAGING EQUIPMENT — Illustrated booklet of equipment for cleaning, filling, closing and conveying containers used in the packaging of liquid and viscous materials. The Karl Kiefer Machine Co.

3. PACKAGING MACHINERY — Illustrated bulletin of a carton forming machine which will make imprinted cartons from rolls of chipboard in your own plant. Costs and specifications. J. L. Ferguson Co.

4. PACKAGING MACHINERY—Booklet describing a line of shipping case sealers and loaders. Illustrations and operating principles. J. L. Ferguson Co.

5. PACKAGING MACHINERY — Illustrated bulletin describing net weighing and volumetric filling machines. J. L. Ferguson Co.

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7. FEEDERS and MASTER DRIVES—36 pages of feeders and master drives for feeding predetermined volumes of dry powdered or granular materials accurately and continuously. Illustrations, specifications and weight-size tables. B. F. Gump Co.

8. VIBROX PACKERS—Bulletin describing several types of packers for compacting materials into various types and sizes of containers. B. F. Gump Co.

9. FILLERS and CAPPERS—Bulletin describing the Pfaudler automatic filler and capper which fills all size bottles from ½-pt. to 2 quarts. Specifications and diagrams. The Pfaudler Co.

10. VOLUMETRIC FILLERS — Bulletins containing complete data on several models of fillers. Specifications and uses. Triangle Package Machinery Co.

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15. WRAPPING MACHINES—Bulletin of a continuous, high-speed production carton wrapping machine, using plain or printed paper. Specifications, illustrations and diagrams. Johnson Automatic Sealer Co.

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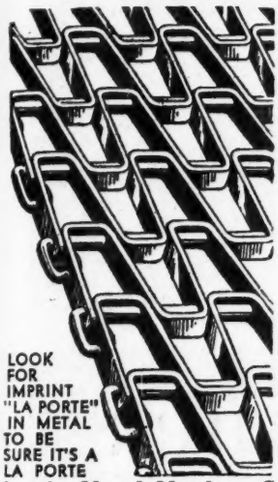

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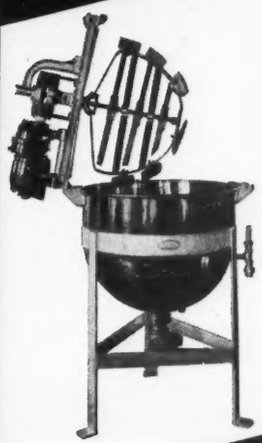

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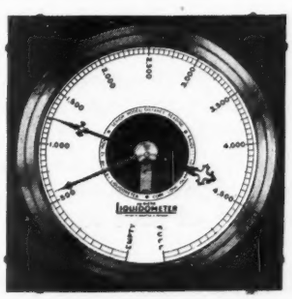

No pumps, valves or auxiliary units required to read levels. Balanced hydraulic transmission system completely compensates for temperature variations on communicating tubing. Accuracy unaffected by changes in specific gravity.

Approved for gauging hazardous liquids by Underwriters' Laboratories and other similar groups. Models are available for REMOTE signals, automatic control of pumps, etc. Direct Reading models may also be installed where remote reading is not desired.

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Simple, efficient, economical — free-action, attentionless 'Reel' scalping, re-cleaning, grading, sifting or bolting of widely varied materials which a 'vibrating-screen' machine cannot handle as efficiently or inexpensively . . . 'Eurekas' are built in several sizes — a capacity for every requirement.

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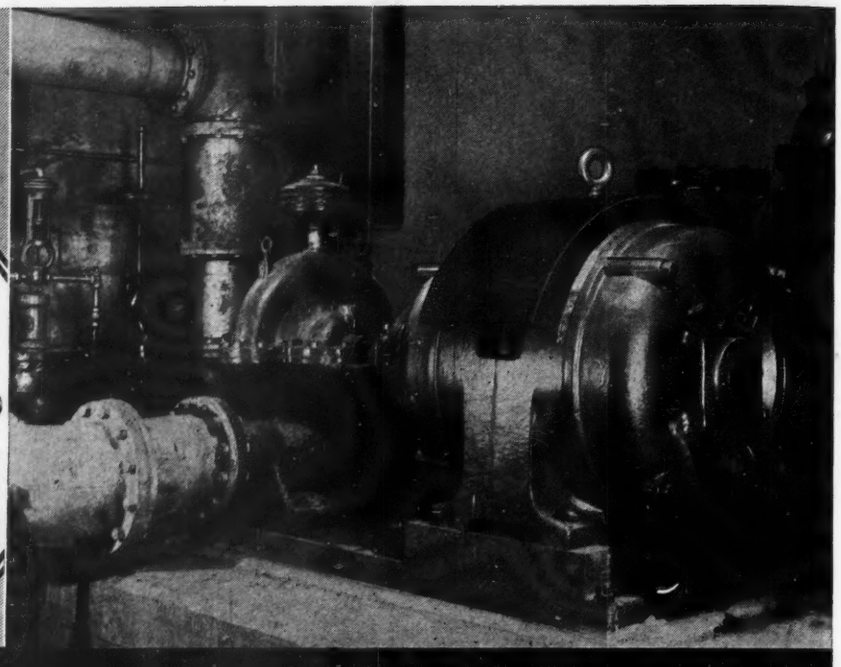
At right: 250 horsepower Century Squirrel Cage Motor driving a pump.



Century TYPE SCX MOTORS
Provide 35% Lower Starting Current

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Centrifugal Pumps
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It will pay you to investigate the advantages of Century Type SCX Squirrel Cage Induction Motors for applications where very low starting current is an essential requirement.

This type of Century Motor will help solve such problems as voltage fluctuations caused by the shock of heavy motor starting current—limited starter and transformer capacity—and in many applications results in a saving on expensive motor control accessories.

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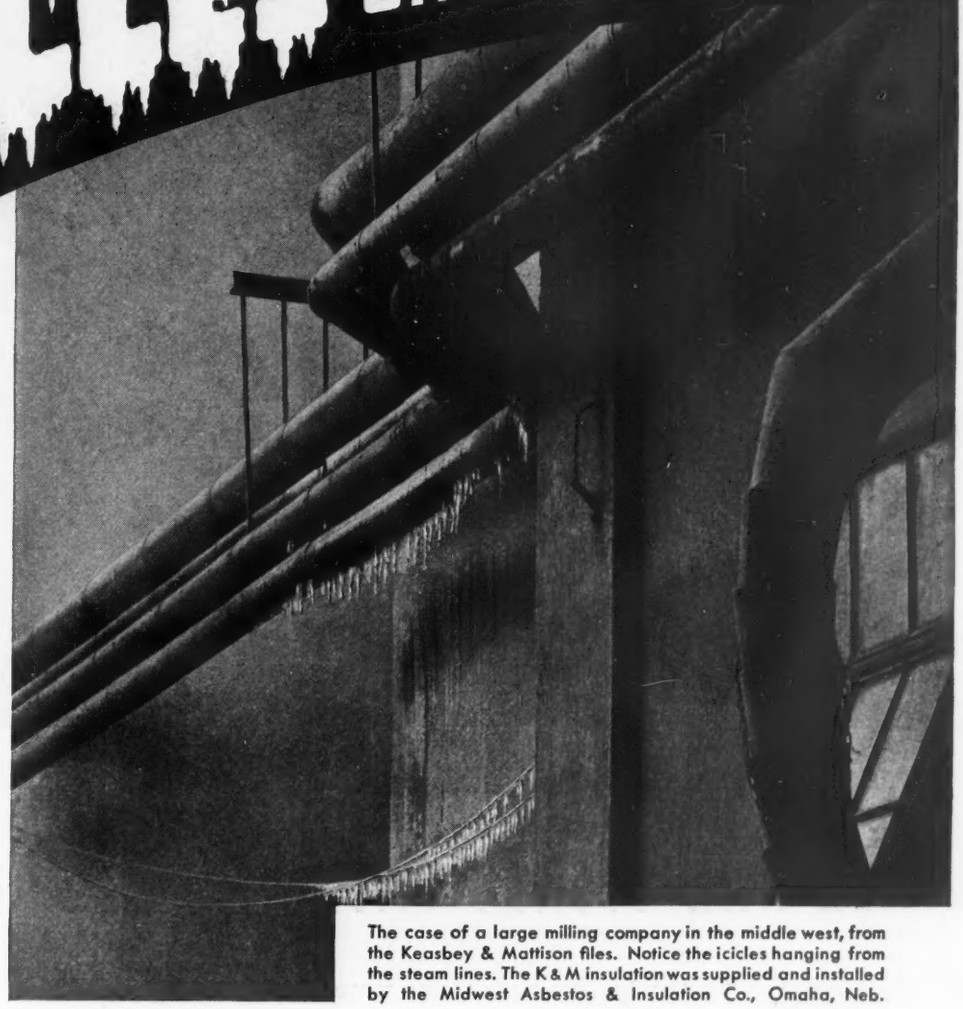

The efficiency of K&M insulation makes it possible

The case of a large milling company in the middle west, from the Keasbey & Mattison files. Notice the icicles hanging from the steam lines. The K & M insulation was supplied and installed by the Midwest Asbestos & Insulation Co., Omaha, Neb.

WHEN icicles grow within inches of 150 pounds of steam, you can be sure the insulation between the two is somewhere close to perfect! That's what happened last winter on these outside steam lines running from the boiler room to the plant of a large middle west milling company. It is not often that you can actually *see* insulating efficiency, but here is a case where you can.

The credit for this performance goes to Keasbey & Mattison insulations—1200 feet of K&M "Featherweight" 85% Magnesia, plus 350 feet of K&M Wool Felt. This dramatic instance emphasizes the importance of the fuel and dollar savings that this efficient K&M installation produces for its owner. Yet this is no isolated instance. Leading industries the nation over are enjoying substantial economies through the use of K&M insulation.

K&M "Featherweight" 85% Magnesia, one of the most efficient heat insulators ever developed for use at temperatures up to 600°F., is a leading product in the K&M line, which includes magnesia and asbestos materials specialized for the needs of each plant.

Keasbey & Mattison engineers, working with K&M Distributors strategically located throughout the country, can point the way to real savings in your plant, too. Write Dept. 11 for full details.

K&M "Featherweight" 85% Magnesia

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Carton handling problems were cut over 66% when Rex chain belts were called into action in this up-to-the-minute winery!

Here, from three sealing machines, three separate Rex Snake chain belts carry the cartons and converge at one central point for easy delivery to storage.

Each machine is serviced by its own conveyor; yet due to this chain belt's ability to turn corners, they've gained the extra advantage of having only one point where cartons must be handled by hand. Time is saved. Money is saved.

Rex Snake chain belt is only one of many Rex chain belts which are particularly adaptable to the handling needs in plants like yours. Whether your problem is bottling, sealing, filling, capping, packaging any and all kinds of food products, the odds are that Rex can show you how to handle it at lower cost. Real savings await your investigation of Rex chain belts for the food industries. . . . Address inquiries to: Chain Belt Company, 1616 W. Bruce Street, Milwaukee, Wisconsin.

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PFAUDLER NEWS FLASHES

FOOD EDITION

DECEMBER, 1940 PUBLISHED BY THE PFAUDLER CO., ROCHESTER, N. Y. Vol. 2, No. 3

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VISIT PFAUDLER BOOTH 33 AT JANUARY CANNERS' SHOW

Chicago, Ill. — Featured at the Pfaudler exhibit at the Canners' Show starting Jan. 20th, will be a Pfaudler-King Model D-12 Juice Filler, Stainless Steel and Glass-Lined Syruping Tanks, Stainless Steel Brine Maker, Stainless Steel Cooking Kettle with agitator (in action) and "Rapid Heat" Cooking Coil for Pfaudler tomato cookers built of Stainless Steel or Glass-Lined Steel, etc.

MIXING AND TILTING TYPE PFAUDLER COOKING KETTLES OFFER MANY ADVANTAGES

Rochester, N. Y. — Several types of agitators have proved popular with Stainless Steel Cooking Kettles.

For mixing heavy products, the single motion, anchor-shaped agitator with baffles and scrapers (optional) creates a turbulence equal to double motion agitator at a much lower cost. No vortex is formed, and the finished product is free from occluded air pockets. It is especially useful during the cooking and cooling of such products as crushed fruit, meat sauces, chili sauce, starch paste, marshmallow creams, etc.

Where gentle agitation is required, motor driven side agitators are satisfactory. If desired, portable mixers may be clamped to kettle rim.

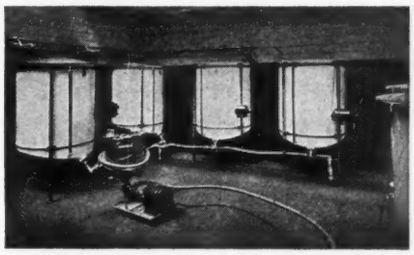
You, too, will find it to your advantage to bring your cooking requirements to Pfaudler. We fabricate any material, Stainless, Monel, Nickel, etc., to A. S. M. E. code.

Note Turbulent Mixing Action

POPULARITY OF "PRECISION-BILT" STAINLESS STEEL TANKS EXPLAINED

Rochester, N. Y.—A recent survey among buyers of "Precision-Bilt" Stainless Steel Tanks and Mixers disclosed that a majority of buyers purchased these tanks for the same reasons.

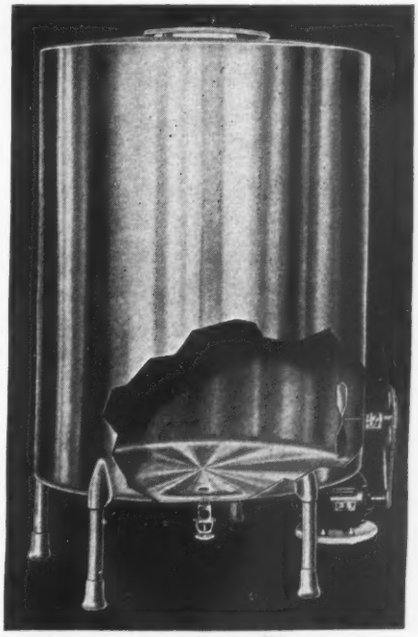
Advantages mentioned for Pfaudler units include:



Syruping room with four motor driven agitator-equipped Glass-Lined Mixers. Note gauge glasses, covers and common discharge outlet.

1. **Quality Appearance**—Heavy gauge metal with No. 4 polish, combined with outstanding operating advantages attracted the most buyers.
2. **Low Price** — In practically every case, buyers stated that they had expected the price to be higher. Standard capacities range from 30 to 500 gallons.
3. **Economy**—The dished bottom head and channeled side outlet plus the sanitary flush valve make complete drainage positive. Typical users state, "Washing takes less time and effort." "Never have any trouble with contamination since installing Pfaudler Tanks." "Nothing is left in the tank."
4. **Standard Units for Special Purposes**—Users with special requirements appreciated the many standard combinations possible with regular accessories such as heating coils, agitators, gauge glasses, casters, covers, including vapor tight, etc. As a result of this wide variety of standard equipment, these users paid much less than they had expected.
5. **Prompt Delivery** — Since many Pfaudler Stainless Steel Tanks are now carried in stock, prompt shipments brought expressions of satisfaction.

For utmost satisfaction and economy in your small tank operations, write for Bulletins 794 and 768.



Cutaway view of Pfaudler Stainless Steel Tank showing dished bottom, channeled side outlet and Stainless Steel agitator and flush valve.

THE PFAUDLER CO., *Executive Offices:* Rochester, N. Y., *Factories:* Rochester, N. Y. and Elyria, O., *Branch Offices:* New York, Boston, Philadelphia, Chicago, Cincinnati. Pfaudler Sales Co., San Francisco and Los Angeles. Representatives in principal cities.

Uncle Sam...

PREPARED TO PRODUCE

WITH TAYLOR'S HELP

FACTORIES hum from coast to coast. Plant lights shine out all through the night. Sounds and sights of this nation preparing to protect our peace, our freedom, our good American way of life.

American Industry has buckled down to its biggest production job since a similar time of need, twenty-odd years ago, and is doing a grand job of it. More clothing, more food, more power, more petroleum *are* already being produced. From eastern to western oceans, vital industrial processes have been stepped up amazingly.

And they have been stepped up confidently, with the absolute assurance that swiftly increased quantity will not mean decreased quality.

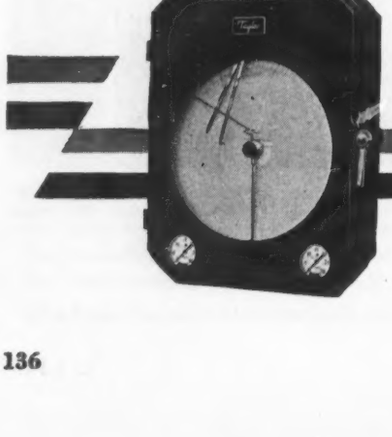
That's where Taylor comes in. Taylor Instruments are helping Industry speed up *safe* production. Taylor Instruments are helping Industry produce to more rigid specifications easily, fully, and economically.

Modern plants use Taylor Instruments—like the great new Taylor Fulscope Controller (the unique five-in-one controller!)—to help make plant operations—manufacturing, processing, or whatever they may be—*automatically* exact, *automatically* foolproof, *automatically* faster and more efficient.

Even in crisis, American Industry *can* be confident. Nowhere else in the world are finer instruments more completely guarding vitally necessary operations.

Taylor is glad and grateful for this vast, unique opportunity to help America "Be Prepared." Uncle Sam *will* be ready. The United States *is* prepared to produce. We *are* producing. Our production is our defense.

Taylor Instrument Companies, Rochester, N. Y. Plant also in Toronto, Canada.



The new Taylor Fulscope Controller helping Industry's huge preparedness program

BE PREPARED WITH **Taylor**

Indicating / Recording · Controlling

TEMPERATURE, PRESSURE, FLOW *and* **LEVEL INSTRUMENTS**

Steel- FIRST LINE OF NATIONAL DEFENSE

Republic Operates the World's Largest Stainless Steel Finishing Mill—

Ten years ago, Republic operated the world's largest stainless steel finishing plant. Each year it seemed to become smaller as ENDURO Stainless Steel found its way into new products—automobiles, trains, airplanes; chemical, textile and food processing equipment; home appliances and even fine jewelry.

Actually, the plant has been enlarged—now covers five acres of floor space—and much new finishing equipment has been added so that, today, Republic still operates the largest stainless steel finishing plant in the world.

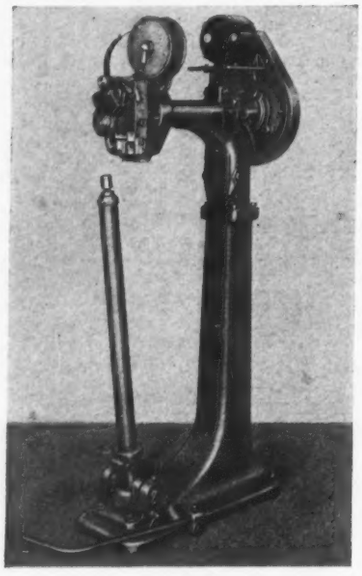
Now, to the huge peace-time need for ENDURO for a wide variety of every-day uses is added the demand of industry working feverishly in the defense of America—for bomb chutes in planes, galleys in naval craft, floats for flying boats and a host of other uses where high strength and heat- and corrosion-resistance are imperative.

Republic has looked ahead—has expanded all its facilities—and, fortunately for every man and woman interested in preserving our freedom, is able and anxious to help in the crisis that now squarely faces America—with more and better ***steel—first line of national defense.***

The line of steels and steel products manufactured by Republic is so diversified that we have prepared a complete listing in Booklet No. 199. A copy will be sent you upon request.

REPUBLIC STEEL CORPORATION • CLEVELAND, OHIO

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY

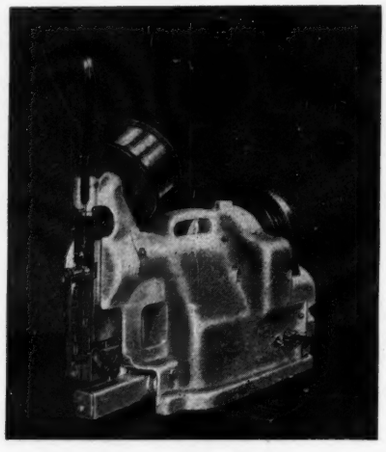


FOR BOTTOM STITCHING YOUR SHIPPING CONTAINERS

The BLISS HEAVY DUTY BOTTOM STITCHER is unequalled for high speed, heavy duty work and long service. Extra large working surfaces of cams, long wearing surfaces for former slides, specially hardened knives which can be reground many times, and hardened tool steel in other working parts, powerful, smooth working clutch and rugged construction throughout recommend the Bliss as the most economical and practical stitcher for plants requiring continuous, steady production on all weights of solid fibre or corrugated containers.

Operates at speeds of 300 or more stitches per minute. Wide clearance between stitcher head and post, and quick action of driver, assure maximum production.

Head is detachable as a unit for quick, economical servicing. One adjustment changes length of wire for thickness of stock. No adjustment required for any size of container. The most durable stitcher built.



FOR WIRE STITCHING FILLED BAGS

You will often find it more convenient to bring this BOSTON PORTABLE BENCH STITCHER to the work to be stitched rather than carry the work to the stitcher. Operates on lighting current—solenoid operated foot pedal.

Stitches articles to cards, small boxes, filled bags and similar work at high speeds. Has 4 inch throat length and uses No. 25 to No. 30 round wire. 3/8" or 1/2" crown. Also 1/4" crown for No. 25 wire only.

DEXTER FOLDER COMPANY

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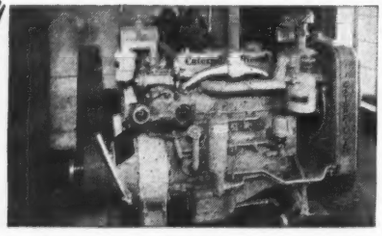
FROM GASOLINE TO DIESEL AT A SAVING OF 50%



With fuel costing only 5½ cents an hour (about half the cost of their former power), this "Caterpillar" Diesel D3400 Engine drives a 5 x 5 York compressor in the milk-products plant of Orbaek Farms, Inc., of Pleasantville, N. Y. "Satisfied and pleased," sums up the manager's report.

Your experience with one of these simple, compact, easily installed power-plants will please you too. Its low operating cost will surprise you (burns cheap, low-grade Diesel fuels, including No. 3 furnace oil). Low maintenance, dependable operation and rugged construction. *Mail the coupon.*

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DIESEL ENGINES AND ELECTRIC SETS

CATERPILLAR TRACTOR CO., *Dept. FI-12*, Peoria, Illinois
I require about_____kw. per hour; or_____hp.
Please send details of "Caterpillar" Diesel Power.
*Name*_____
*Address*_____

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of the FOOD INDUSTRIES

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- Canning Tomatoes and Tomato Pulp
- Carbonated Beverages
- Chocolate and Cocoa Manufacture
- Cleaning and Polishing Rice
- Confectionery
- Corn Products
- Dried Fish Meal
- Dry Rendering of Lard
- Edible Gelatin
- Edible Oil Processing
- Flour Milling
- Ice Cream
- Macaroni
- Malt Syrups
- Meat Packing
- Milk Plants
- Preparation of Salted Peanuts and Refining of Used Cooking Oil
- Prepared Mustard
- Refined Cane Sugar
- Tapioca

These Flow Sheets, developed by Food Industries, are specifically designed for production men to give them basic information on standard processes in use throughout the food field. Size 8½ x 11 inches, attractively bound in a paper folder. Price 50c for the complete set listed above.

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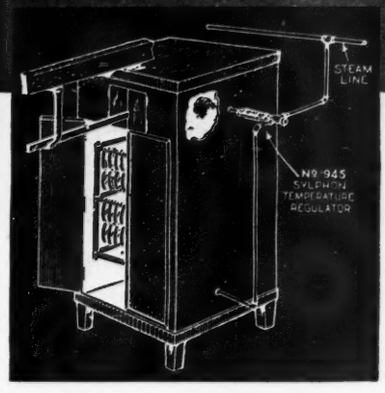
PROTECT PRODUCT QUALITY...

SAVE *Steam, Time, Money*



In food processing—Sylphon Automatic Temperature Regulators banish rule-of-thumb uncertainty and attendant spoilage, save labor and supervision, and cut fuel costs often as much as 30%. That is why these self-contained and self-powered regulators are guarding vital temperature points in many leading plants in every branch of the food industry.

Illustration above shows a Sylphon No. 945 Regulator installed on a sausage cooker, and throttling the amount of steam supplied to the cabinet to maintain the exact predetermined degree of temperature found best for this process.

This simple "one-piece" regulator is merely installed in the incoming steam line with its thermostatic bulb projecting through the upper cabinet wall. Write for Bulletin No. **XG-20** which describes the many applications of Sylphon Controls in cooking, drying, smoking, proofing and other food plant processes. Sent on request.

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KNOXVILLE, TENNESSEE
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Step Up Production

and Maintain Hand-Pack Quality

Fruit and Vegetable Filler

The CRCO Hand Pack Fruit and Vegetable Filler is simple and durable in construction —trouble-free in operation. This Filler is built to CRCO standards by skilled workmen, employing the best materials — thus insuring long, low-cost service.

Although the filling operation is practically automatic, this filler always gives that much desired hand-pack quality.

For still greater production, yet maintaining the same high quality pack, the CRCO Filler is also available with Worm Feed Hopper, Automatic Topper and Plunger Briner.

Send for special Filler Bulletin No. HP-46.

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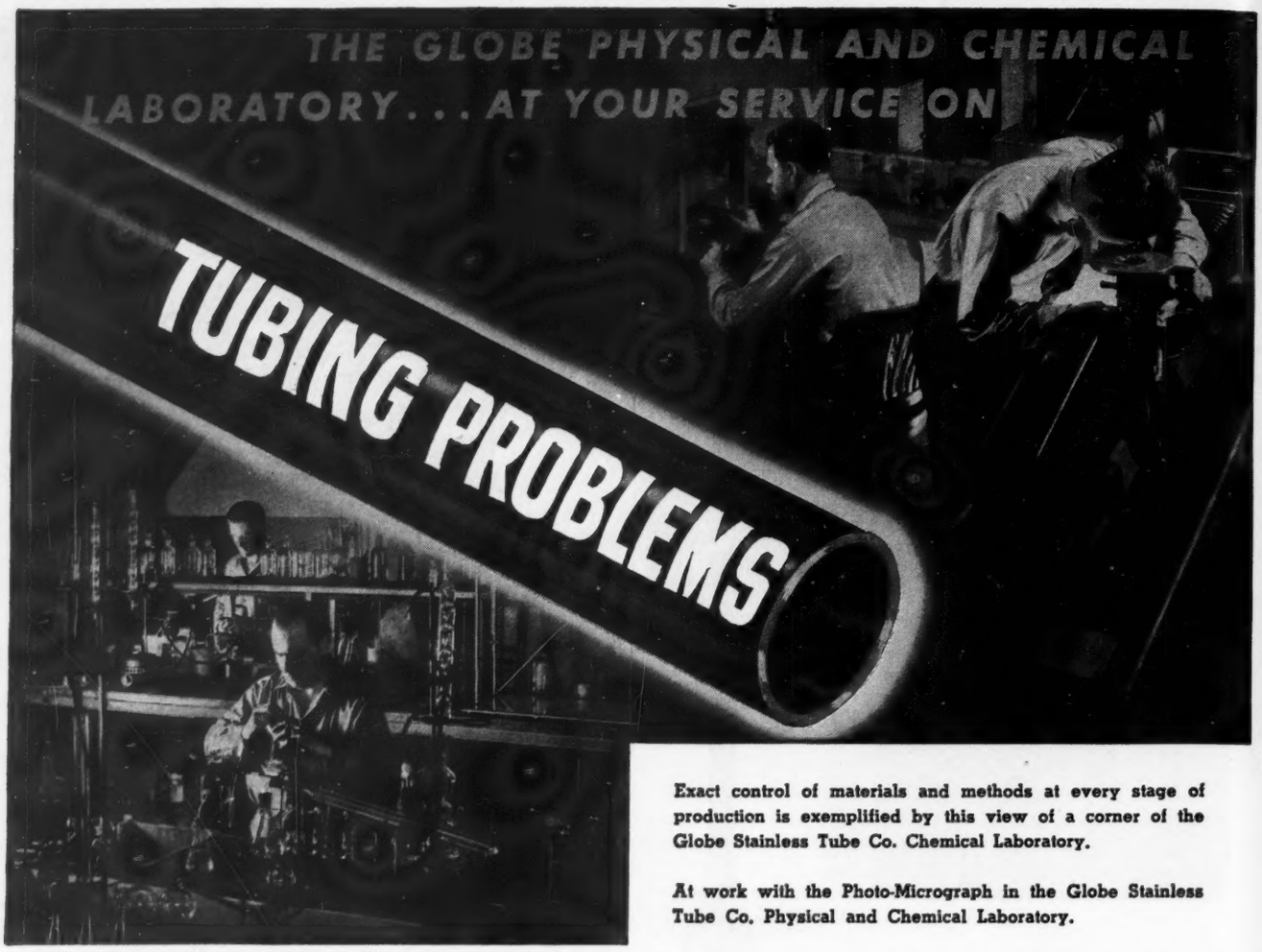

Exact control of materials and methods at every stage of production is exemplified by this view of a corner of the Globe Stainless Tube Co. Chemical Laboratory.

At work with the Photo-Micrograph in the Globe Stainless Tube Co. Physical and Chemical Laboratory.

The Globe Stainless Tube Co., pioneer in the manufacture of Stainless Tubes, maintains a large, well-equipped chemical and physical laboratory for its own use and for the convenience of its customers. The laboratory is under the supervision of graduate chemists and metallurgists who are prepared to make all chemical, physical, and microscopic examinations of steel which present-day requirements may demand . . . We will gladly cooperate with you on any tubing problems which you may have, and will make recommendations as to the best alloy suited, based on previous experiences and tests.

GLOBE STAINLESS TUBE CO. • 4006 W. BURNHAM ST., *Milwaukee, Wis.*

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That's the Record

in Thousands of Retail Food Outlets on America's "Main Street"

THESE are diversified success stories. No set formula applies. Checking moisture-vapor loss is the key to one sales gain; protection against moisture-vapor absorption achieved another. Another product used its "eye appeal" for the first time in a transparent MENASHA package; "buy appeal" came to another in a stunning, stand-out design. Yes, the formula varies, but the end is the same — more sales, more profit for food packagers. It takes diversified resources to do a complete package-planning job and MENASHA has them. From timberlands to pulp and paper mills from paper machines to printing presses and conversion processes MENASHA controls every step. Its technicians, designers and craftsmen pool experience to do the complete job. These resources are available to you any time. Discover how packaging by MENASHA can mean more profits for your products.

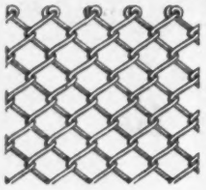
THE MENASHA PRODUCTS CO.

DIVISION OF MARATHON PAPER MILLS CO.

MENASHA, WISCONSIN ★ REPRESENTATIVES IN PRINCIPAL CITIES

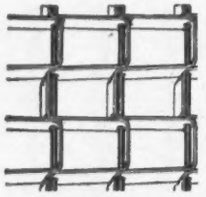
Menasha's Precision Papers for Precision Packaging

FOR *Sanitary Handling* OF FOOD PRODUCTS . . .



Chain Link Conveyor Belt

Flat Strip Conveyor Belt



U·S·S CYCLONE *Stainless Steel Conveyor Belts*

DEMAND for conveyor belts fabricated from Stainless Steel is increasing rapidly. Manufacturers of food products, in particular, look with special favor upon Cyclone Stainless Steel Belts because they resist the corrosive action of food acids indefinitely, last longer and remain completely sanitary throughout their full period of use.

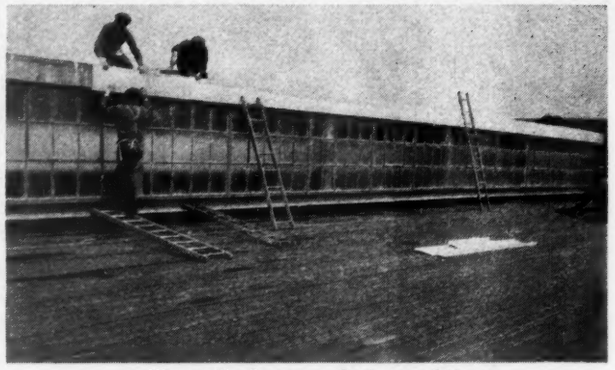
Cyclone Metal Conveyor Belts are supplied in two types—Flat Strip and Chain Link. They provide trouble-free product handling—allow free circulation of air and liquids. Not affected by water, steam, heat, cold or temperature changes, they require little maintenance—keep production flowing smoothly.

Write us for further facts about these belts. Also available in galvanized steel or in special metals and alloys.

USS CYCLONE "Red Tag" METAL CONVEYOR BELTS

CYCLONE FENCE COMPANY
Waukegan, Illinois

UNITED STATES STEEL



Westerville Creamery, Covington, Ohio

CREAMERY ADDITIONS *Protected by*

Carey BUILT-UP ROOFS

TO meet demands of its fast-growing business, the Westerville Creamery recently completed two additions to its plant: one for receiving—one for storage. Both buildings have CAREY Built-Up Roofs laid over insulation. Roofs were applied by the Kienle Heating & Sheet Metal Company, Piqua, Ohio.

The Westerville Creamery, like many other food processing companies, selected CAREY Built-Up Roofs because of their ability to furnish long, untailing protection against weather. CAREY Roofs are BONDED to give definite years of trouble-free service—*they must be right.* Write for book—"Master Specifications for Built-Up Roofs." Address Dept. 32.

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- **Produces 11½ billion dollars worth of products annually;**
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Food Industries reaches this market

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GET RID OF "*Factory Film*"

WITH NEW DULUX HIGH-HIDING MILL WHITE

HOW "FACTORY FILM" OCCURS . . .

The dust, dirt, and smudge that settle on plant walls and ceilings form a dull, lifeless film . . . which cuts down light reflection. The yellowing of inferior mill whites is another cause of "Factory Film," making repaintings more frequent than necessary.

DULUX . . . THE MODERN WAY TO CHECK "FACTORY FILM"

DULUX High-Hiding Mill White reduces formation of "Factory Film" to a minimum because its hard, tile-smooth surface offers dirt no foothold. It is easy to keep clean. DULUX gives maximum light reflection. Its tough film resists yellowing, making repaintings few and far between.

DULUX *High-Hiding Mill White*
Makes one-coat jobs possible!

Du Pont developed a method of *increasing the concentration of high-hiding pigment particles in suspension . . . while maintaining an unusually good spreading rate.* This stepped-up hiding power is so intense that DULUX often does the job with ONLY ONE COAT!

This means new lows in economy. For you need fewer gallons per job, and labor costs for application are substantially reduced. And most important of all, DULUX means *speed* in application. The paint crew goes over your walls and ceilings *once* instead of twice . . . and the job's done.

DULUX is a mill white of brilliant, uniform whiteness . . . gives maximum light reflection . . . has amazing whiteness retention . . . and is washable. Send in the coupon for full details.

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3 WAREHOUSES 3
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Ask Them—
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Packed away in these issues is the accumulated knowledge and experience of many food experts—managers, superintendents, consultants. When you hit a *new* problem it's a comfort to know what others did in similar circumstances. The article that is trite today may be vital tomorrow.

Fill in blank at the right and return now. Attach check or we will bill you later.

Conspiracy
IN YOUR PLANT?
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Complete range of capacities (35 g.p.m. to 4000 g.p.m.) for electric motor, Diesel or gasoline engine, or steam turbine drive. Open or closed impellers, oil or water lubrication. Today's 6" F-M Turbine is 23% more efficient than the same size was in 1927; today's 10" turbine is 21% more efficient than the 10" pump was in 1927!

YES, a conspiracy between a pump and the power meter!

A conspiracy that can—and DOES—go on unnoticed year after year in hundreds of plants where old pumps are imposing a 10% "penalty tax" on the operating budget? That *is* happening in your plant—if your pumps are old. Due to improved methods, improved materials, and improved design, today's Fairbanks-Morse Pumps are at least 10% more efficient than the same types were ten years ago. Thus, if your old pump is as good as new (it probably isn't), it is costing you at least 10% more to operate it than it would cost to operate a new one. *10% is a good return on any kind of investment!*

It won't cost you anything to find out how much new pumps would save you. Write Fairbanks, Morse & Co., Dept. 33, 600 S. Michigan Ave., Chicago, Ill. Branches and service stations throughout the United States and Canada.

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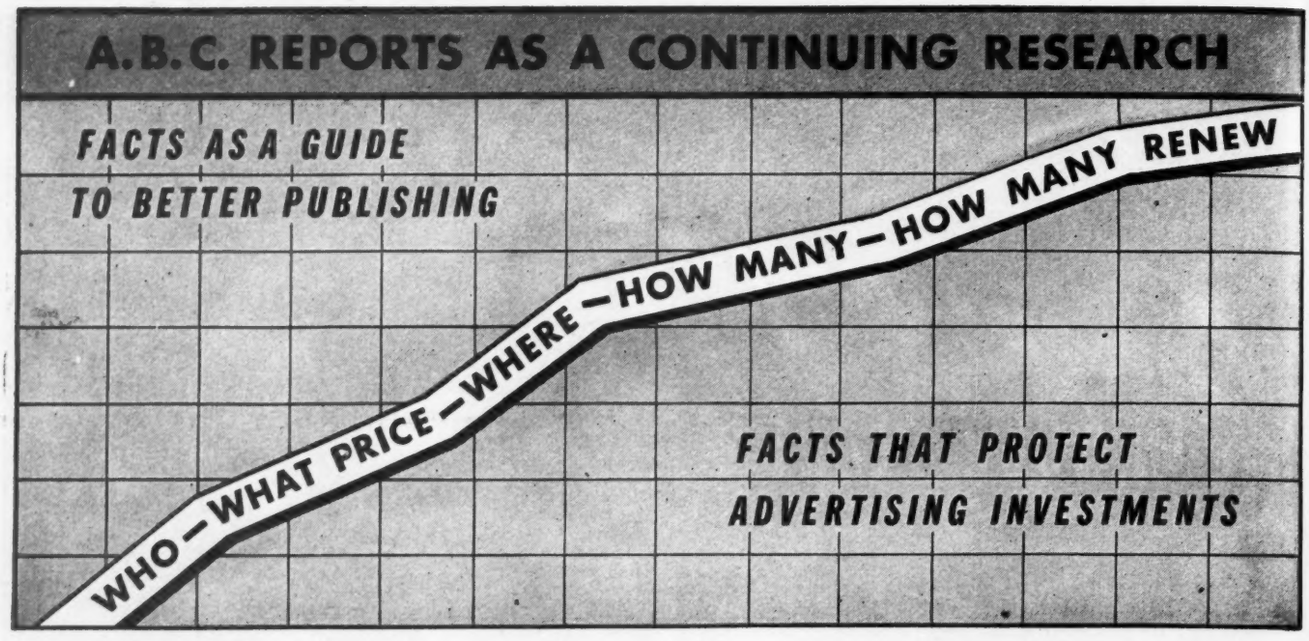
MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS



WHAT? A PERPETUAL SURVEY?

Yes, and it covers every subscriber!

GETTING direct, periodic reactions of subscribers and making editorial use of facts so obtained is one of the important ways to build and maintain specific kinds of readership on a solid foundation.

But—

Who are the readers attracted by this publishing policy? What do they pay for the publication? Where are they located? How many? How many renew?

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FOOD INDUSTRIES

A McGRAW-HILL PUBLICATION—330 W. 42nd St., N. Y.

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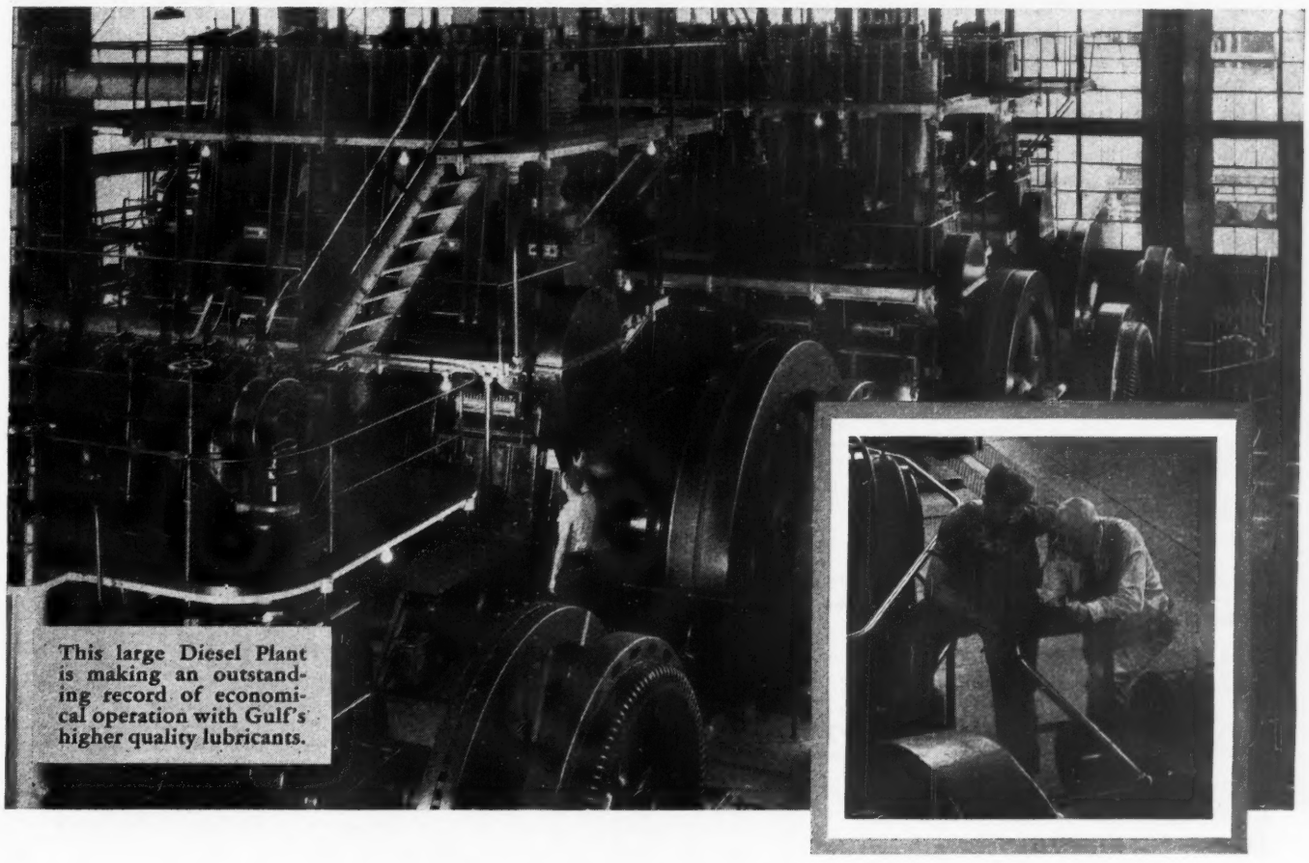
--our records prove it!" ...says this Chief Engineer



This large Diesel Plant is making an outstanding record of economical operation with Gulf's higher quality lubricants.

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"WE feel sure that Gulf's higher quality lubricants have played a big part in the outstanding operating record we've made in our plant," says this Chief Engineer. "Our big Diesels are in top-notch condition—our maintenance costs are lower than they have ever been."

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Please send me my copy—no charge—of the booklet "GULF PERIODIC CONSULTATION SERVICE."

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offer distinct advantage over dry spices and oils because they are more soluble and the absorbtion ratio is therefore greater. The flavor value compares favorably with the essential oils and the cost is about the same.

In all spice flavors and mixed for every flavoring requirement. Also made up for private formula mixtures.

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7. **Controlling Production and Materials**—a management function of food engineering. An eight page article which explains a system for coordinating sales, production and the purchase of materials in such a way that trouble is avoided. 10 cents each.

9. **Quality Separation by Differences of Density**—a unit operation of food engineering—by the editor of Food Industries, Dr. L. V. Burton. This is a specially bound, 15-page article of interest to all food manufacturers. Contains 16 charts, diagrams and photographs. 35 cents each.

11. **Magazine Feeds Solve Some Package Wrapping Problems; (12) Materials Handling; (13) Evaporation; (14) Mixing (in 2 parts); (15) Centrifugal Separation**—all unit operations of food engineering. These articles have appeared as a series in Food Industries and are offered separately or as a group. Each reprint is complete in itself and adequately illustrated with workable diagrams. All 10 cents each.

20. **Public Relations for Industry**—a presentation of the imperative need of mutual understanding in the conduct of our daily work . . . with special reference to the food industries. 25 cents each.

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26. **"261 Mistakes to Avoid in Packaging"**—a 32 page booklet containing a series "mistakes" that have been appearing monthly in Food Industries beginning with the March, 1939 issue, together with additions of previously unpublished material. It covers practically every type of food product and package. Price: 15 cents each.

17. **Minimum Quality Standard for Canned Tomatoes**—as issued by the U. S. Dept. of Agriculture, Food and Drug Administration—with authentic color swatch. Price 10 cents each.

18. **Tentative United States Standards for Grades of Frozen Lima Beans**—as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatch. Price 10 cents each.

19. **Tentative United States Standards for Grades of Frozen Peas**—as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatch. Price 10 cents each.

24. **Tentative United States Standards for Grades of Canned Grapefruit Juice**—as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatches. Price 15 cents each.

25. **Tentative United States Standards for Grades of Dried Prunes**—as issued by the U. S. Dept. of Agriculture, Agricultural Marketing Service—with authentic color swatches. Price 10 cents each.

22. **1939 Edition Frozen Foods Directory.** Lists companies engaged in packing frozen food, together with the location of their plants, brand names, products packed, containers and systems used, and output. 35 cents each.

23. **Packaging for Frozen Foods—Packaging Machinery, Containers & Supplies—Mistakes to Avoid in Packaging**—a 48-page booklet, attractively bound in 2-color paper covers, and originally published as a special supplement to the March, 1939 issue of Food Industries. Contains information of lasting value. 35 cents each.

27. **Dehydration Equipment.** As applied to Food Processing—Explaining the various methods of drying foods; kinds and types of dryers—16 pages—reprinted from the December 1939 issue. Price: 25 cents each.

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I have circled below the reprints I want and enclose check ( ) cash ( ) covering cost. Please mail at once.

6 7 9 11 12 13 14 15 17 18
19 20 21 22 23 24 25 26 27

My Name..... *Title*.....

Company .....

Street .....

City and State.....

FRESH-FROZEN FOODS
FEATURED IN
"CELLOPHANE" CAMPAIGN

THE SATURDAY EVENING POST
Them fresh-frozen things sho' is scrumptious in "Cellophane"!
HER HUBBY WAS CRAZY ABOUT PEAS!
Cellophane
DU PONT
BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

MILLIONS OF READERS of The Saturday Evening Post will see and read this latest message of fresh-frozen food progress and the quality protection provided these foods by "Cellophane" cellulose film.

This advertisement is part of a campaign carried on over fifteen years that has made the American housewife look for "Cellophane" protection on the foods she buys.

"Cellophane" preserves freshness and flavor in frozen foods by preventing dehydration and oxidation. And by giving this vital protection it plays a major role in promoting consumer acceptance for these products.

For full information about the use of "Cellophane" on quick-frozen foods, just ask us. Write: "Cellophane" Division, E. I. du Pont de Nemours & Co. (Inc.), Wilmington, Delaware.

Cellophane
TRADE MARK

"Cellophane" is a trademark of E. I. du Pont de Nemours & Co. (Inc.)

DU PONT

Tune in "Cavalcade of America"... NBC Red Network... every Wednesday evening

SEARCHLIGHT SECTION

(Classified Advertising)

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Business Opportunities

Equipment — Used or Resale

UNDISPLAYED RATE:

10¢ a word, minimum charge $2.00; Positions Wanted ½ the above rate.

Box Numbers—Care of publication New York, Chicago or San Francisco offices count as 10 words.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

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The advertising rate is $5.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

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CHEMIST now employed in food industry, desires change. Ph.D. in nutrition and biochemistry (minor organic chemistry). Familiar with food chemistry, vitamins and vitamin bioassay methods. White, 30, married. PW-482, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

PRODUCTION AND QUALITY CONTROL MAN with thorough knowledge of processing and handling of all commodities in frozen foods manufacturing and merchandising. Desires suitable connection with reputable packing concern or distributing organization. Twelve years of practical and technical experience with the two leaders of this industry. Highest credentials. Write PW-483, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED

#958 ENTERPRISE POWER juice extractor. 200 gal. glass lined tank. Small vacuum filling machine for crown cap beverage bottles. Guraehs Food Products, 112 Sherman Ave., Jersey City, N. J.

WANTED

Established Distributors

For POTATO CHIPS in Middle West

We manufacture one of the most outstanding potato chips in the country and we know our high quality merchandise will be an asset to any aggressive distributor. Overnight service to most central points. For full information write

GEISER'S FOOD PRODUCTS CO.

2555 No. 3rd St. Milwaukee, Wisconsin

WANTED

Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan; 2—Dry Powder Mixers, with or without Sifters; 2—Rotex Screens; 1—Packaging Machine; 2—Tablet Machines; 3—Filters; 1—Glass Lined Kettle.

NO DEALERS

W-421, Food Industries
330 W 42nd St., New York City

In a Hurry? We Have The MACHINES You Want

1—Pneumatic Scale Packaging Unit.
2—Pneumatic Scale Automatic Wax Liners.
2—Pneumatic Scale large size Tite Wrap Units.
1—9' Copper Vacuum Pan.
1—U. S. Bottlers combination #4, Filter, Filler, Pump & Motor.
1—Pfaudler 500 gal. Glass Lined jacketed Stainless Steel agitated Kettle.
3—K.K. & U.S. Rotary bottle Rinsers, m.d.
1—Meaker Cracklin Expeller, with tempering apparatus, 30 H.P. motor.
29—Aluminum Copper, Glass Lined, Jacketed and agitated Kettles.
12—Copper, Aluminum, Glass Lined, Vacuum Pans, up to 500 gal. cap.
1—Rogers 6' All Copper Vacuum Pan. Complete.
1—Cherry-Burrel #500 Viscolizer, motor driven.
4—Mechanical 4x9' Lard Roll, m.d.
1—#6 Sweetland Filter, 12 bronze leaves, 3" c.c.
27—Vacuum Shelf Dryers, all sizes.
2—20x48" Rotex Screens.
1—J.H. Day #2 Brighton Mixer, 80 gal. cap. motor driven.
1—American 28"x60" Double Drum Dryer.
1—Buffalo 48"x108" Double Drum Dryer, m.d.
1—Johnson mod. JA 30 Cellophane Wrapper, m.d.
1—Johnson Automatic Top & Bottom Sealer.
1—Penumatic Scale 6-head Capper, with automatic Cap Feeders.
4—Shriver Iron P & F 24"x24" O.D. Filter Press.
2—World Rotary Automatic Labeling Machine.
1—World and 1—Ermold semi-automatic Labeling Machines.
2—Karl Kiefer Visco Filling Machines.
1—Stokes #15 Powder Filler.
1—75 gal. Pfaudler glass lined Mixer stainless.
6—8 to 40 gal. Pony Mixer.
15—Dry Powder Mixers from 50 to 4000 lbs.
1—Stokes & Smith auger type Automatic Powder Filler.
2—80-qt. Century 4-speed Mixers, motor driven.
2—Mikro Pulverizers; 1—12", 1—24", m.d.

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We buy and sell from a Single Item to a Complete Plant

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Buy With Confidence — "Consolidated"

LIQUIDATION

Modern Machinery used by

NEWTON

PRODUCTS COMPANY

3rd and Eggleston Sts., Cinn., Ohio

AT SACRIFICE PRICES

PARTIAL LIST SEND FOR CIRCULAR

18—Steam Jacketed Copper Kettles, with and without agitators, from 10 to 200 gal. cap.
1—Karl Kiefer 7-spout Jar Filling Machine, 1 qt. cap., motor driven
1—Pneumatic Machine Co. Standard Automatic Jar Capping Machine
1—Filler Machine Co., 4 piston Paste Filler, adjustable up to 1 lb.
2—Brightwood Improved Automatic Carton Making Machines
1—Karl Kiefer Filling Unit, gravity feed, 6 spouts
2—Bottle Cappers, motor driven, Crown, Cork & Seal Co., and Closure Service
1—World Jar Labeling Machine
2—Ermold Bottle Labeling Machines
1—Burt Can Labeling Machine
2—Johnson Carton Sealing Machines
7—Mustard Mills, 6 with 48" and 1 with 42" grinding stones, with cypress wood tanks
14—Wood Processing Tanks, Hauser-Stander Co., with and without agitators—800, 1500 and 2500 gal. sizes.
2—Seed Grinders, Schutz O'Neil, complete with Dustless Receiving Boxes.
4—Ice Machines, complete with motors, condensers, etc., 30, 40, 7½ and 4 ton
8—Air Conditioning Units, self-contained, complete with motors, blowers, etc.

— INSPECTION INVITED —

Representative on Premises Daily

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UNION STANDARD EQUIPMENT CO.

320-322 LAFAYETTE ST., N. Y.

We Pay Cash for Single Machines or Entire Plants

STEAM JACKET, COPPER KETTLES

New and good Rebuilt guaranteed

15 to 500 gallon capacity, with and without agitators; guaranteed steam pressure.

Hamilton Copper & Brass Works

Hamilton, Ohio

Responsible Coppersmiths Since 1871

NEW AND USED

Steam Jacket, Copper Kettles

20 to 300 gal. capacity.

THOS. BURKHARD, INC.

494-496 Flushing Ave., Brooklyn, N. Y.
Coppersmiths Since 1836

Diesel Engine Generator Plant

3—Duplicate 219 KVA G.E. Alternators 2400/480/240 V. 3 ph. 60 cy. 200 RPM each direct connected to 260 HP Buckeye Diesel Oil Engines complete.

10 years old. Perfect condition. Used 5 years.

MOORHEAD-REITMEYER CO., INC.

30th & Brereton Sts.

Pittsburgh, Pa. May. 7900

GOING OUT OF BUSINESS

1—Stainless Steel 24 Filter Press (12 units ¾")
1—Stainless Steel Jacketed (250 Gallon) Tank
1—Gehnrich Electric Sterilizer (11 Cubic Feet)
1—Davis Steam Water Still (35 Gal. Per Hour)
1—Copper Tin lined Tank (300 Gal.)
1—Alsop Glass lined Tank with cover & motor (30 Gallons)
2—Alsop Glass lined Tanks with covers (50 Gallons each)
1—Air Compressor (Ingersoll Rand Type 30)
1—Stainless Steel Pump
1—Powers Regulator (Steam)

LACTYS INC

53 Undercliff Rd. Montclair, N. J.

Phone Montclair N. J. 2-0658

WHAT'S NEW?

That's what you want to find out . . . that's why hundreds of Canners and Food Processors attend Conventions and Association meetings. Add to your store of current developments in processing, methods and equipment by reading FIRST FACTS.

Read it and REAP!

NEW IDEAS Last issue of "First Facts" our periodical mailed regularly to 50,000 men like you contained news of 87 brand new developments in processing. The new issue has over 100 novel and arresting paragraphs regarding new processing ideas. Send for your copy.

NEW GUTS Briefly, our business is to put new guts in surplus equipment. That means more than just a paint job. The unit is torn down to its basic frame and rebuilt with new GUTS and heart for long life and enduring heavy duty production. When it goes out it bears the FMC Guarantee.

NEW CHALLENGE New York's largest stock of FOOD and CANNING equipment will be found in our warehouse. We challenge you to name the machine . . . we'll quote you and give you complete details, blue prints, and price. No long lists in THIS ad. What do YOU need?

NEW EQUIPMENT TOO! Sales representatives for Pfaudler, Metal Glass, Lee Metal, Bump Pumps, Service Factory Handling Equipment, Howes Mixers, Budget Hoists etc.

FIRST MACHINERY CORPORATION

GUARANTEED EQUIPMENT

F M C

LIQUIDATORS APPRAISERS

EAST 9th STREET and EAST RIVER DRIVE

GRamercy 7-6622
Cable: "EFFEMCY"

NEW YORK, N.Y.

LIQUIDATION

Purefine Food Corp.
54 W. 21st St., New York City

SYRUP and PRESERVE PLANT

Shriver 18" Aluminum Filter Press—Closed Delivery; Self-Priming Westco Turbine Pump—Bronze—for Shriver Press;

Burkhard 40" Vacuum Pan, Copper Steam Jacketed, about 250 Gallons.
Copper Steam Jacketed *Vacuum Pan,* about 60 Gallons.
Karl Kiefer Duo Bottle Cleaner with Compressor and Motor.
Kane 10 HP *Boiler* with Fittings and Circulating water system.
Palmer Bros. Hydraulic Fruit Press 36" x 36" racks with Cloths.
Copper Steam Jacketed Kettle—300 Gal.

Send for Bulletin D

CANNING SPECIALS

2—40" x 72" *Retorts* with 3 Baskets
2—40" x 48" *Retorts* with 2 Baskets

Anderson Dicer #2 M. D.
Ayars Pea and Bean Filler
Labelers

Send for Bulletin C

MACHINERY & EQUIPMENT CORPORATION
59 E. 4th Street GRamercy 3-6466 **New York City**

REBUILT MACHINERY

1—Kiefer 16 spout Automatic Rotary Vacuum Bottle Filler
1—O & J Rotary Automatic Labeler
4—Burkhardt 40 to 100 gal. Copper Jacketed, Agitated Kettles
20—Copper and Aluminum Kettles, 10 to 250 gals.
4—Copper Vacuum Pans, 60 to 350 gals.
10—Powder Mixers, 100 to 3000 lbs.
3—Hobart and Century 80 qt. Mixers
3—Kiefer Visco and Mono-Piston Fillers
4—U. S. Colloid Mills
1—Glascote 500 gal. Jacketed Kettle
10—Glass Lined Tanks 50 to 1000 gals.
20—Shriver Filter Presses, 12" to 36", cast iron and wood
2—Mayonnaise and Preserve Fillers, 4 and 6 heads
10—Bottle and Can Fillers
Complete stock Conveyors, Pulverizers, Packaging Equipment. Filling Equipment, Cappers, Mixers, Labelers, Pumps, etc.

Send for latest Bulletins

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FOR SALE

250 gal. Stainless Steel Tank, jkt., agit.
200 gal. Stainless Steel Insulated Tank.
200 gal. Pfaudler Tank, jkt., agit., 38x42.
275 gal. Pfaudler Tank, jkt., agit., 48x36.
330 gal. Pfaudler Tank, jkt., agit., 45x48.
450 gal. Pfaudler Jkt. Tank, 54x48, agit.
No. 11 Devine Vacuum Dryer, 17 shelves.
24"x36" Double Drum Dryer.
10 H.P. Schwab Tubeless Boiler.
50 gal. Pfaudler Glass Lined Emulsifier.
1500 and 2000 gal. Stainless Steel Truck Tanks.
24" Sperry Stainless Steel Filter Press.
2" Stainless Steel Centrifugal Pump, 5 H.P.
60 to 1000 gal. Homogenizers or Viscolizers.
3 ft. to 7 ft. diameter Copper Vacuum Pans.

Large Stock of Refrigerating Machinery, also Milk and Ice Cream Plant Equipment.

Send Us Your Inquiries.

ROBERT P. KEHOE MACHINERY COMPANY
1 East 42nd Street, New York, N. Y.

FOR SALE

1—Hansen 6-pocket #10 can Filler
1—Karl Kiefer Visco Filler
6—#300 and #600 DeLaval Clarifiers.
1—#5 Sweetland Filter
5—Copper Vacuum Pans 3 to 6'.
1—4x9' Allbright-Nell Cooling Roll.
1—Stokes & Smith Double Powder Filler.
4—F. J. Stokes Powder Fillers.
3—#10 and #20 Day Imperial Mixers.
1—Ideal Carton Stitcher with motor.
2—Rotary Bottle Rinsing Machines.
2—M&S Universal Filling Machines.
5—Bottle and Can Labeling Machines.
6—Viscolizers, Homogenizers and Colloid Mills.
Dough and Powder Mixers, Bottle and Can Fillers, Filters, Filter Presses, Mills, Dryers, Pumps, Boilers.

Send us your inquiries, also your list of surplus equipment, which we purchase for cash.

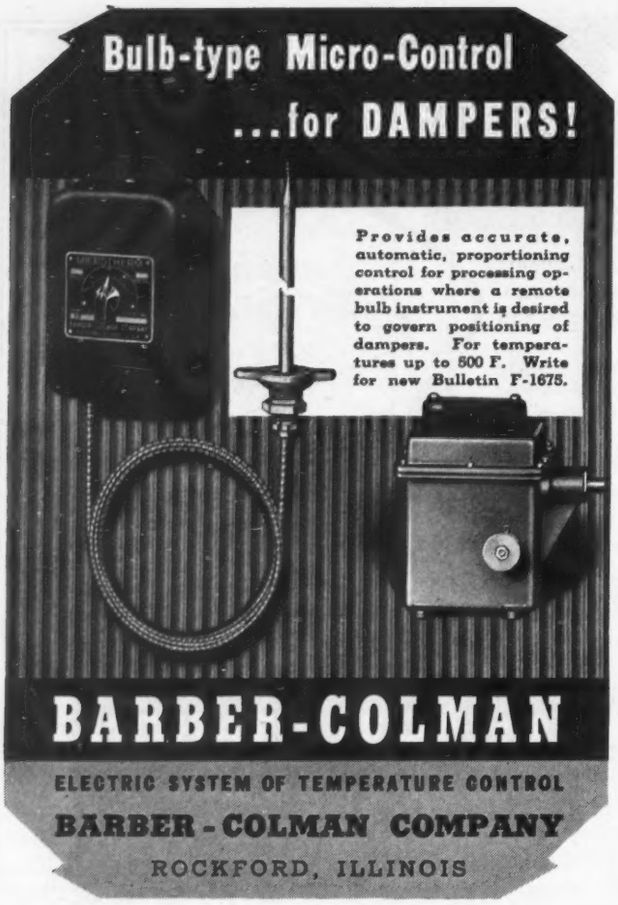
LOEB EQUIPMENT SUPPLY CO.
908 N. Marshfield Ave., Chicago, Ill.

FOR SALE

Read 80 Qt. Mixer, type X.H.D.
Hobart 80 Qt. Beater, Model M-180
Triangle Bag Filler, type SK
Schutz O'Neill Dustless Sugar Pulverizers, No. 0 and No. 2
300 gallon Glascote Jacketed Glass Lined Tank with motor driven agitator
150 gallon Pfaudler Jacketed Glass Lined Tank with motor driven agitator
50 gallon aluminum jacketed Kettle
60 gallon aluminum tilting kettle
400 gallon Homogenizer with 20 H.P. A.C. motor

Also large stock refrigerating machines and mixers

SAVAGE BROS. CO.
2632-46 Gladys Ave., Chicago, Ill.


Bulb-type Micro-Control
...for DAMPERS!
Provides accurate, automatic, proportioning control for processing operations where a remote bulb instrument is desired to govern positioning of dampers. For temperatures up to 500 F. Write for new Bulletin F-1675.
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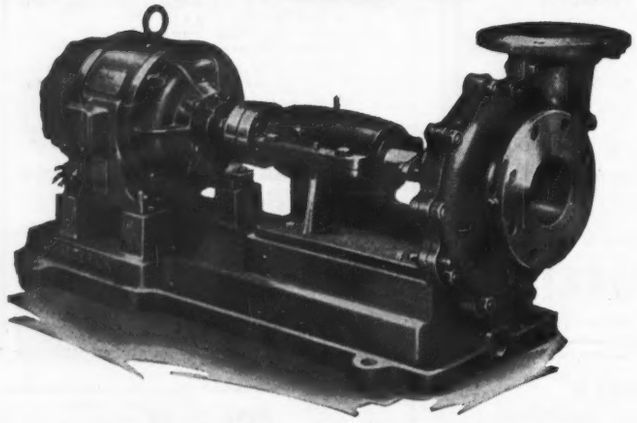
ELECTRIC SYSTEM OF TEMPERATURE CONTROL
BARBER-COLMAN COMPANY
ROCKFORD, ILLINOIS

CENTRIFUGAL PUMPS



FOR ALL PURPOSES

In Stainless Steels, Acid Resisting Bronze, Nickel, Lead, or any alloy that might be required.

Frederick Pumps are designed by experienced engineers who are thoroughly familiar with conditions under which the equipment is used. A large list of installations attests the merits of Frederick Pumps. *Write for Bulletin.*

THE FREDERICK IRON & STEEL CO.

FREDERICK, MARYLAND

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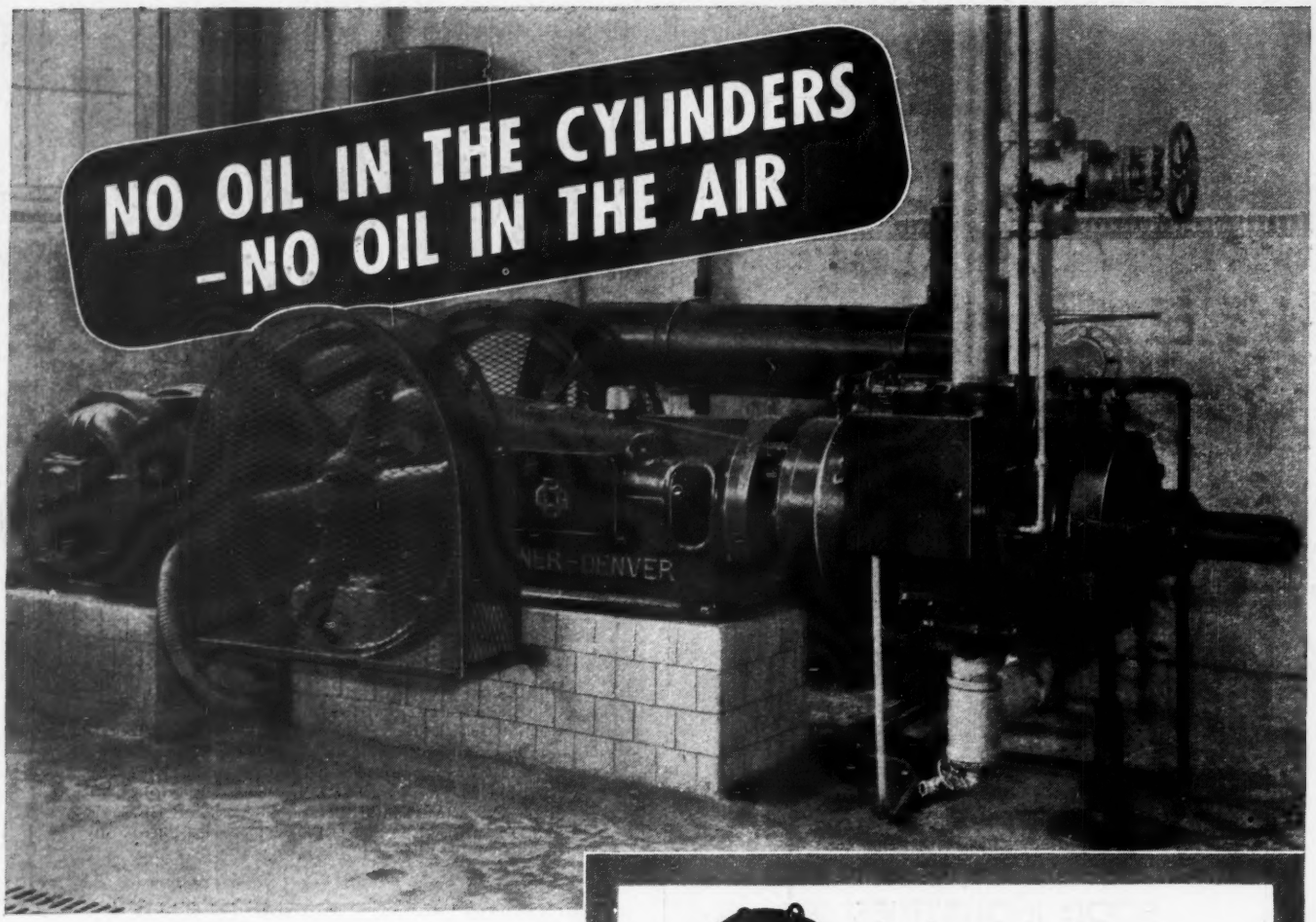

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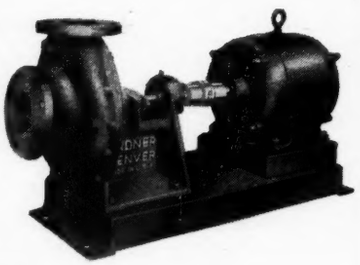

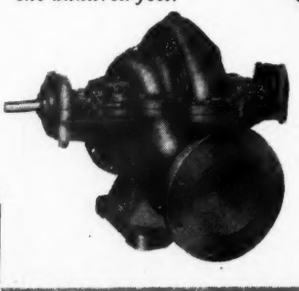

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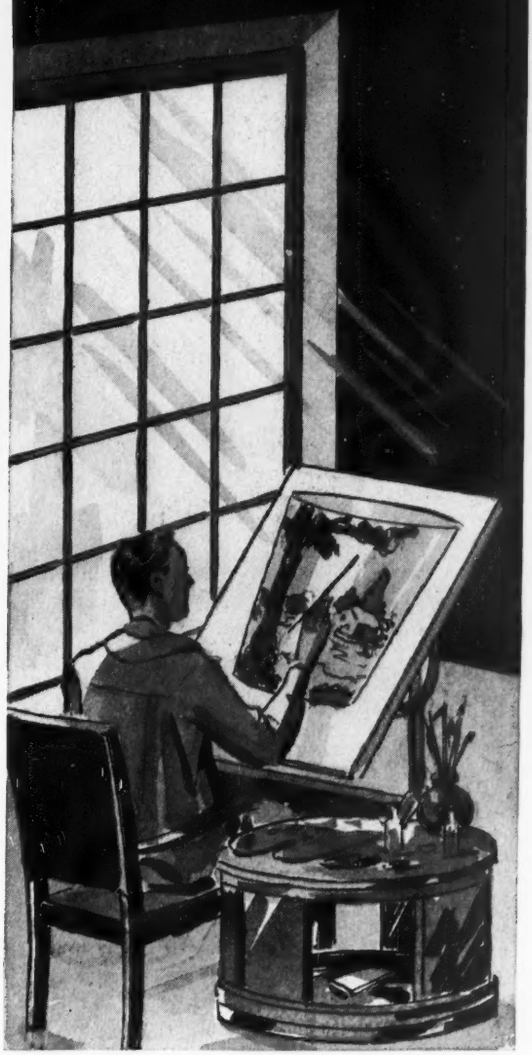

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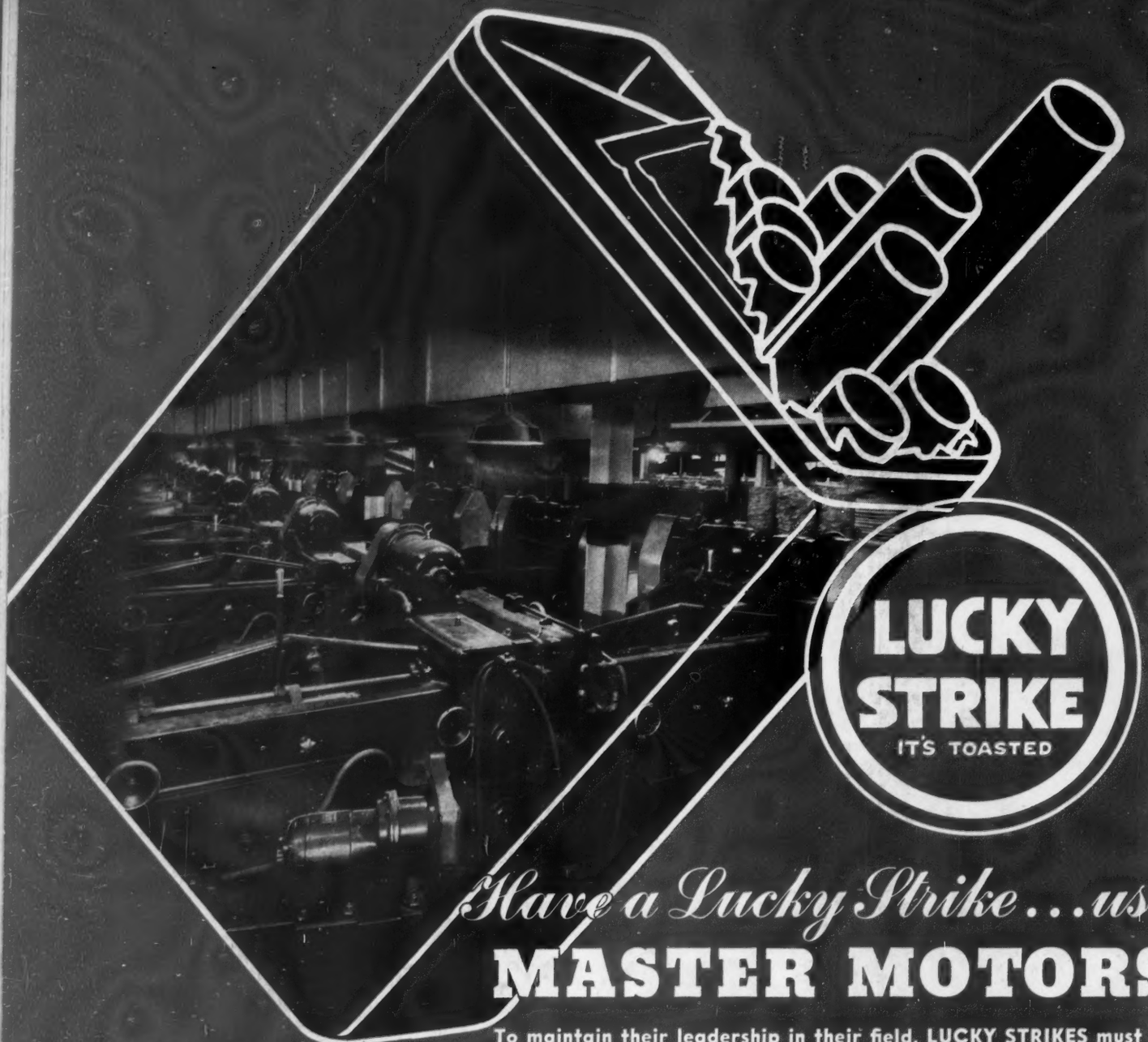

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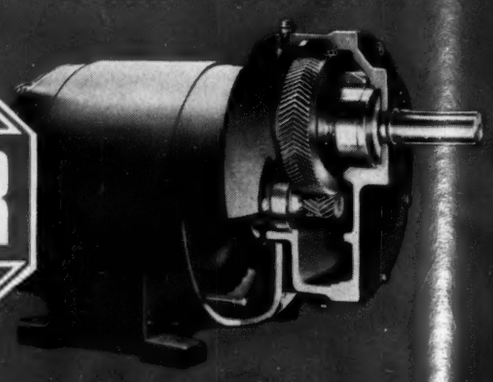
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